Bonefish & Tarpon Journal

A publication of Bonefish & Tarpon Trust

Stewardship Through Science

2015 Edition

WHAT'S INSIDE:

Bonefish & Tarpon Journal
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Bonefish & Tarpon Journal
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2015 Fundraising Events:
Boca Grande, FL – January 31, 2015
Islamorada, FL – February 12, 2015
Naples, FL – March 14, 2015
New York, NY – April 1, 2015
Denver, CO – October 8, 2015
Jackson Hole, WY – Date TBD
Scottsdale, AZ – Date TBD
Chicago, IL – Date TBD

Cover Photo by:
Capt. Derek Rust

BTT is proud to feature the 2015 Artist of the Year:

Mike Stidham

Read more on page 45

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2015 Edition

www.btt.org

FEATURES

ARTICLES

BTT'S MISSION

To conserve and enhance global bonefish, tarpon and permit fisheries and their environments through stewardship, research, education and advocacy.

Setting the Hook

IT'S OURS TO BEQUEATH

A Note from the Chairman and President

Tom Davidson
Chairman

Matt Connolly
President

What an extraordinary year 2014 has proven to be for Bonefish & Tarpon Trust. So often in our endeavors to acquire much needed knowledge to enable us to be responsible stewards of the flats fishery we find ourselves humbled to say "the more we learn, the clearer it becomes how much more we need learn". The past 12 months have been transformative in many ways, suddenly some of the dots have become more clearly illuminated and happily we now have bright lines connecting them!

What we learn in one ecosystem often makes our understanding of interrelationships in another flats system more easily understood. For example we have located specific bonefish staging areas and spawning sites in the Bahamas; for the first time their complete act of spawning has been witnessed and videoed. In the Keys, juvenile bonefish had to date defied our efforts to locate them, that is until just recently. Now we can not only identify the species, we can also, through DNA, sleuth their natal origins. In this issue of the *BTT Journal* you will find more about these discoveries as well as other BTT endeavors related to tarpon and permit.

Recently the great American biologist E. O. Wilson observed that our culture began with the advent of agriculture. Wilson may view it a quantum leap but, as stewards of our shallow water fishery in the Caribbean Basin, we too are going through a process not dissimilar from our predecessors. The journey to becoming an agrarian society required understanding everything that could be learned about their environment in order to successfully cultivate plants as well as manage animals. While we don't harvest a crop in the John Deere sense, we journey with high hopes to the flats with the intent to "harvest a memory". We do so by striving to connect the focus of our expanding scientific attention to our human experience in a moment of leisure ecstasy. Through a simple length of thread we not only connect ourselves to our precious wild wards, but to our own wild hunter/gather roots. Those often humbling encounters compel us to commit to growing our enlightenment and more deeply committing ourselves to science based husbandry. Like our forebears, we too are learning all that we can about our ecosystems and determining the best management strategies for bonefish, tarpon, and permit.

The enormity and complexity of modern man's footprints on the planet means we have no clean slate. In this century critical habitats are often broken and in dire need of rehabilitation and the intact ones must be preserved. There is also the challenge of changing centuries old cultural practices to better guarantee resource sustainability. To compound matters, the objects of our attention are highly motile creatures which live part of their life cycle in several nations. In spite of these daunting truths BTT is aggressively pursuing scientifically sound solutions through integrated programs of research, education, advocacy and habitat restoration. Our work takes us to the Keys, the states of the South Atlantic coast and the Gulf of Mexico; and we are in the Bahamas, Cuba, Mexico, Belize, and Puerto Rico.

In addition to our impressive conservation gains in 2014, we greatly strengthened our capacity to succeed by adding record numbers of new members, donors, stakeholders and gifts. Many of you recently came to join us through exciting new BTT events in Islamorada and Boston. Our fifth and most successful Symposium was an early sellout having a record number of international scientists and anglers as well the sharing of new research findings. Partners such as Bass Pro Shops, Patagonia, Costa, Hells Bay, Maverick, Orvis, Orion, and The Outdoor Channel inspire and enable us through their exemplary corporate conservation conscience. Most of all we are most fortunate to receive your generous support and want you to know we never take it for granted as we are deeply appreciative of your much valued support.

Let us not forget what our talented and gracious friend Joan Wulff once observed, "I used to think someone was taking care of the flats, then I realized no one was!" You, we, BTT are the flats keepers! Enable us to further success by making a difference through the enlistment of others, by increasing your commitment and please consider sharing this Journal with others. It's ours to bequeath!

Tom Davidson is a Founding Member and Chairman, and Matt Connolly is President of Bonefish & Tarpon Trust

Photo: Tosh Brown

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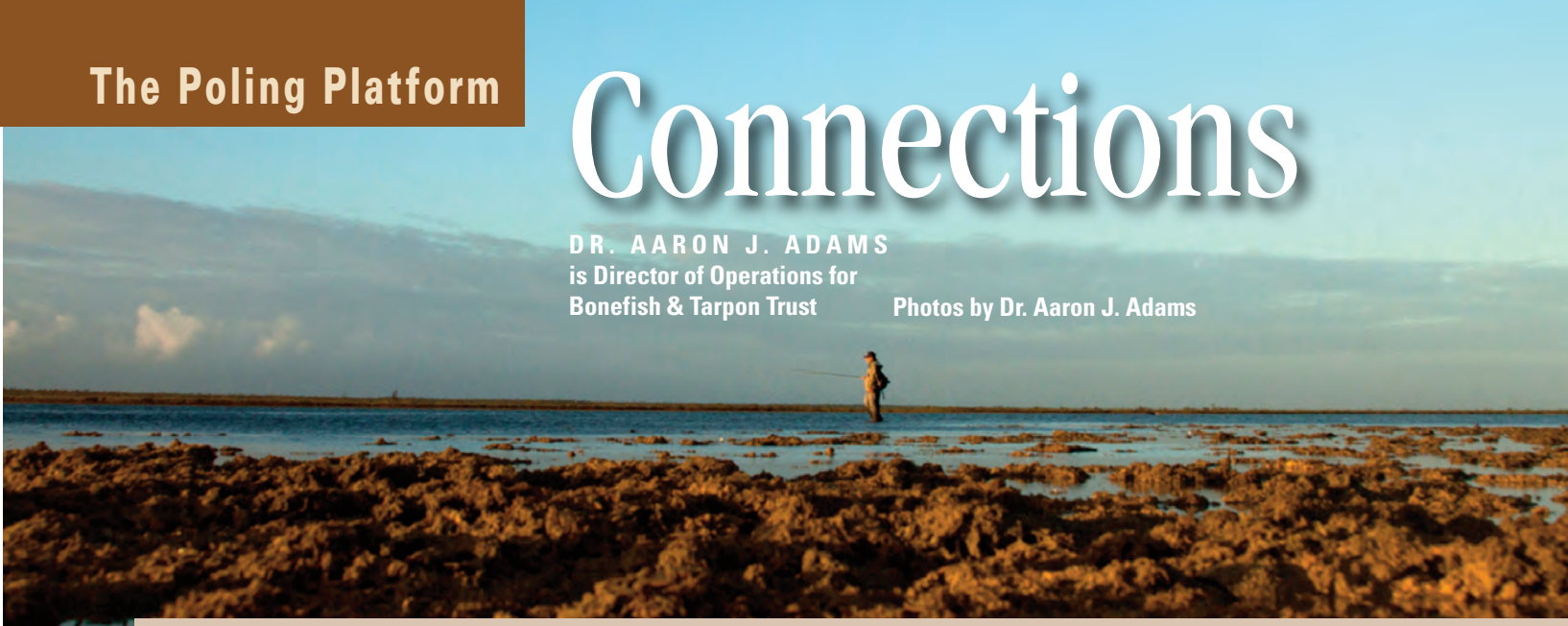
Connections

DR. AARON J. ADAMS
is Director of Operations for
Bonefish & Tarpon Trust

Photos by Dr. Aaron J. Adams



The water that had drained off the mangrove flat with the ebb tide had left the uneven, algae-covered bottom exposed to air. Even as the tide turned to flood, small rivulets continued to drain the depths of the mangrove-covered, limestone flat. The soft light of early morning combined with an overcast sky to cast a cloak of grey. The strong winds that had been rising with the sun each day were light enough in the early morning that the short mangroves cast a wind shadow over the leeward shoreline.

Small crabs scurried in the shallowest of water, quickly grabbing their own meals before the water deepened enough to allow hungry bonefish to enter. Small fish darted back and forth in the tiny, isolated pools of water that they called home during low tide, searching frantically for shelter that didn't exist, finally diving into the sand bottom as I stepped over the pool.

The slick water surface was soon broken by a fin, and then a tail of a bonefish eager to move onto the flat with the rising tide. The bonefish crawled through a shallow trough, only an inch or two deeper than the surrounding flat, a stealthy invader. When it reached a shallow knoll, and could somehow sense water beyond, the bonefish wriggled itself over almost dry ground, body exposed for an instant, before settling into a new pool. The occasional splash of the tail and body shudder revealed another meal consumed. The bonefish found a slough, and started to cruise toward me along the shoreline. I cast my fly in front of the fish, let the fly settle, and waited as the fish approached.

Whether stalking tailing bonefish, pushing through mangrove thicket in search of small tarpon, or standing on the bow of a skiff scanning the horizon for permit, we are all looking for a connection with a fish. First on our minds, as it was for me as I stalked that bonefish on a breezy morning, is the connection we get with a tight line. Then it's the blistering run, and in the case of tarpon the acrobatic jumps. That's what brings smiles to our faces and generates the stories we tell.

But there are also other connections. For me on that morning, it was the surroundings as much as the bonefish. And it was about being able to understand what factors bring bonefish into those areas. Was I connected enough with bonefish to be in the right place at the right time? Had I tied on the right fly for the occasion?

When pushing through thick mangroves in search of baby tarpon, there has to be a deep connection as well, one that brings together the fish, habitat, weather…. What makes the fish tick, choose certain habitats, swim here in July and there in January? So many backcountry mangrove ponds look the same to the casual observer, but some hold tarpon and some never do.

With permit, it's not only about being in the right place at the right time, it's also about understanding their behavior. What are they eating, are they in the mood to dig for crabs or chase swimming shrimp? Hit them on the head or lead them with the cast? The more connected you are to the 'ways of the permit', the better chance you have of getting that tight line connection.

I think it's true that 80% of the fish are caught by 20% of the anglers. I think this is largely due to the fact that those 20% of anglers are the most connected to the fish. In a sense, they are able to 'think like a fish' to be in the right place at the right time giving a fish what it wants to eat. It's what we all aspire to on every fishing day, and what some achieve more than others. It's what the pursuit is all about.

There are also connections that I think about a lot that might not make it into most conversations about fishing, but are critically important nonetheless.

The first is the connection between fish and their habitats. Do we know enough to protect the right habitats to keep our fisheries healthy? Can we identify the right places to conduct habitat

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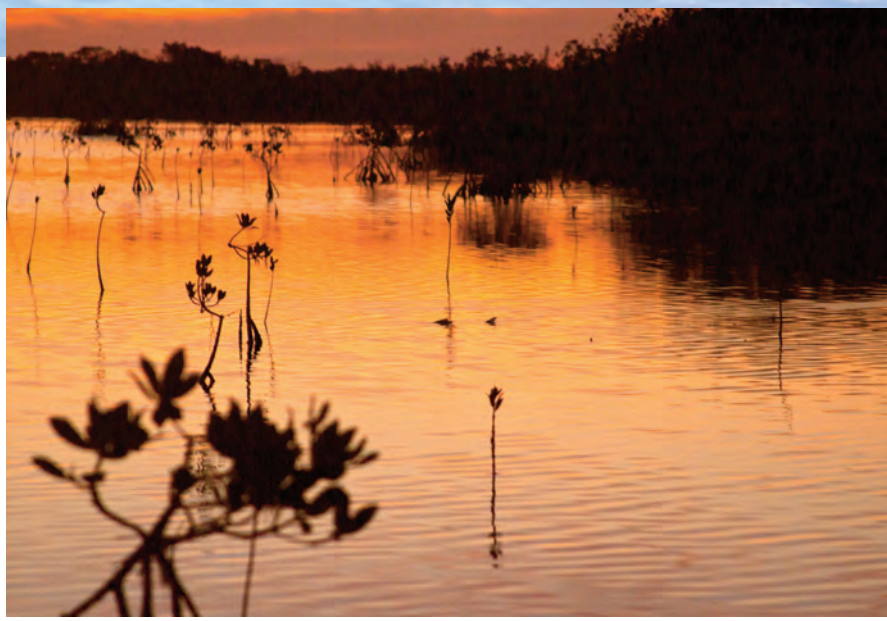
restoration? Do we understand the habitat characteristics that are best for the fish, and how these are connected to things like fish growth and survival? With much coastal habitat already lost to development, and more habitat under threat, the fish-habitat connections have to be a priority for conservation.

I also think a lot about the connections between different locations. To what extent, for example, are the bonefish in Cuba related to bonefish in Florida or the Bahamas? Do larvae spawned in Cuba make it to these far-off locations? Is the Sian Ka'an Biosphere Reserve in Mexico, large enough to protect the permit population that supports the well-known permit fishery in Ascension Bay? Are tarpon populations more connected by migrations of adults or by the oceanic travels of larvae? To a great extent, all conservation is local, whether it's about habitat protections, fisheries regulations, or habitat restoration. But it's also regional, because we know that to at least some extent our fisheries are connected. The challenge is figuring out these connections so we can focus conservation efforts most effectively.



Perhaps most important are the connections between anglers and the fish. Do we understand that when, where, and how we fish is not only important for catching fish, but also has implications for conservation?

Perhaps most important are the connections between anglers and the fish. Do we understand that when, where, and how we fish is not only important for catching fish, but also has implications for conservation? Practicing responsible fish handling for catch and release, for example, is extremely important to ensure the fish we release live to be caught another day. As anglers, do we understand enough about the fish and their habitats to really 'get it' when it comes to conservation? Do we see, for example, the connection between declines in water quality and declines in our fisheries? I think that many of us do understand these connections, and more are 'getting it' every day. It is going to be this understanding, and acting on the understanding to improve conservation, that makes the future bright for bonefish, tarpon, and permit.

I think it's only fair to bring things full circle. As the bonefish reached the spot where the fly lay in the bottom, I twitched the crab fly once. The bonefish rushed the fly, slurped it, and was off to the races when it felt the hook. A few minutes later, I released a fat, 7 pound bonefish and watched it slowly swim down the flooding shoreline. I'd made my connections.

My hope is that we can continue to work together to make sure that we can continue to have these types of opportunities, and to ensure that those who come after us do as well.

Join the Effort

(front of shirt, left side)

BTT is a membership-based organization, and our members are our lifeblood. Since our founding in 1998, we have grown to include concerned anglers from over 20 countries, researchers from throughout the world, and guides committed to working with BTT in order to educate anglers and gather data while on the water. Nearly 90 cents out of every dollar you donate goes directly to our mission: research, outreach and education.

Our continued success can only be guaranteed by your generous support and that of our fellow anglers.

We have celebrated so many victories, but there is so much more work to do. We need your support to do it! A stronger membership base equates to added research dollars and more voices to benefit bonefish, tarpon, permit, and their valuable habitats.

Please help us in our mission by joining, and urging your friends, guides, lodges, and fishing clubs to join. Depending on the level selected, members will receive new BTT items that include a T-shirt with artwork by Stanley Meltzoff, new BTT hats, rods and reels, plus big discounts on orders from Patagonia. Please fill out and mail in the form below or go to **www.btt.org** and click "**Join BTT**" to become a member today.

BONEFISH & TARPON TRUST

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The 5th International Bonefish and Tarpon Trust Symposium: 15 Years of Progress

MIKE HODGE
is a freelance outdoor writer who lives and fishes in Florida

Photos by Pat Ford

Jeff Harkavy pondered the past and took inventory of the present. The Bonefish & Tarpon Trust Symposium was good, but could be better. It was a matter of making the leap from good to great. With growth comes change. Change, of course, involves risk.

So as Harkavy and the rest of the BTT Board of Directors kicked around a few ideas about planning for the Symposium back in 2009, he brought up the idea of making the affair more inclusive.

"It was my observation over the course of the event history we were doing great science, and those with a science interest came, saw and enjoyed and were wowed by what we were up to, but they were highly academic," Harkavy said. "Because they were known as academic gatherings, what happened is the heart of the fishing community didn't turn out. They'd rather be fishing or on the water, so I made the argument that we should make this equal part science, equal part fishing mastery."

Added to the itinerary of the two-day event was a fishing smorgasbord. There were guides' seminars and panel discussions along with a session or two with the legends of light-tackle saltwater angling. Fly tiers and artists were also invited. What started out as a gathering of scientific minds turned into a sportsman's paradise.

"It was a model that made a lot of folks happy," said Harkavy, who serves as BTT's secretary. "It had a good afterglow. We stuck with it this time around."

The change in format led to even more growth as the 2014 Bonefish & Tarpon Trust Symposium turned out to be the best yet as more than 500 participants visited Dania Beach for the Nov. 7-8 event at the IGFA Hall of Fame and Museum. Although no official attendance figures were assessed, it's fair to say that interest has doubled since the early years.

"With that strategy, it played out rather well, beyond expectation," Harkavy said. "Listen, the scientists are always going to be excited about what we're doing. For the ones participating, it's a great way to convene with other scientists working on similar tracks. To get the fishing community out there to take in just a spoonful of science here and there was really powerful. We weren't able to lead them to the science in the first two symposiums. By making all of these other fun attributes part of the event, it brought people out."

The first Symposium was held in 2003. The event is scheduled every three years to celebrate BTT's accomplishments and define the conservation group's goals and sharpen its mission to improve the habitat for bonefish, tarpon and permit.

"The big thing is it's about education," BTT Director of Operations Aaron Adams said. "In that sense, it's education in multiple ways. It brings scientists in so they can educate people about the research they've been doing, which plays into conservation and fishing in many instances. It's also education because the scientists can learn a lot from the guides and anglers. It's that type of interaction. It's also educational for resource managers that were there—Everglades National Park, Biscayne National Park, FWC. It's very much interactive, and education is a big part of it for sure. It gets everyone who is involved in what BTT does in one place."

Information abounded. In one room, Andy Mill held court about catching tarpon; in another, master fly tier Enrico Puglisi weaved his magic at the vise. There was more. You could learn how to cast a fly farther; you could also learn how to build a better fly rod. All in one weekend.

"The people, the staff at BTT and some of the other scientists, their energy and passion came out," BTT board member Ken Wright said. "We had standing room only in a number of those rooms. One of the complaints that was

The IGFA Hall of Fame and Museum

The Legends Panel answers questions from the audience.

heard was that there was so many in attendance, they couldn't all get into the room and people were all wanting to go to a number of discussions and one conflicted (with another), so they had to make a choice—that's a good problem."

Format semantics aside, the primary purpose of the Symposium is to bring people together for the greater good of preserving of inshore angling. Not everyone agrees on how to solve conservation problems, but most, if not all, agree that problems need to be addressed.

"It is a community, if you want to solve the community's problems, everyone needs to get together and be a part of it," said Al Perkinson, Vice President of Marketing for Costa Del Mar. "There does need to be a base level of science. Everyone has opinions. Everyone has part of a picture. Science tells us, look, here's what the real story is. We can all adjust and make changes. …I like that it's not just a bunch of hype. It's not sugar-coated. This is hardcore science. People are willing to sit down and learn this stuff because they're so passionate about the sport."

Perkinson's passion is permit, which is why he helped start BTT's Project Permit, which is now in its fifth year.

"I guess I'm sort of an intellectual person," Perkinson said. "I need to know the whole picture. These things are so incredibly complicated and the solutions involve so many things. You have to have government. You have to have the commercial interests. Everyone has to play a role and solve the problem. It's very complex. Our population is growing and our civilization is taking more and more of our natural world. To try to check that for fish, the fish is a big underdog. We're all underdogs as well. It takes everyone coming together."

By and large, our angling community is growing older, but are there enough younger faces to replace those who taught them? It's an issue that came up frequently at the Symposium, particularly at the Friday film festival, which was implemented, at least in part, to appeal to a younger crowd.

It's a strategy Perkinson used at Costa, which marketed GEOFISH and GEOBASS. Both are big hits in the fly-fishing community and on the Fly Fishing Film Tour.

"I saw *Trout Bum Diaries, Patagonia*," Perkinson said. "I thought this is what we need to be doing to get young people involved in fly-fishing. It was like the (surf film) *Endless Summer* for fly fishing."

Nearly 200 or so stopped by for BTT's Friday night shindig, which started with an art show and ended with a fly-fishing film presentation. Several pictures stood out and won awards. Viewers' Choice: *Knockin' On The Door* by Will Benson/World Angling; Viewers' Choice runner-up: *Miami Bite* by Dan Decibel; and Best Conservation Message: *Origin Of The Sky* by Marc Montocchio.

All had quality fishing footage with an interesting storyline.

"You have to make it entertaining," Perkinson said. "You have to make it fun. You have to make it about adventure. College kids love to road trip. They love to explore. At that point in their life, being an explorer helps define them as a person and helps reinforce their independence from mom and dad and all of that. I think hooking fishing up with exploration is one way to do it."

Without fish to catch, our sport perishes. BTT was founded in the Keys, and most anyone who has fished the Keys knows that the bonefish population has declined. That's the big reason BTT started the Keys Initiative six years ago. Since then, we've learned that we can't blame lack of food as a reason and we've found suitable habitat for juvenile bones; now it's a matter of finding the fish and their patterns. Needless to say, that's not easy. Before you can understand a species of fish, you have to evaluate an entire ecosystem.

"Our biggest threat is a lack of understanding of the local bonefish fishery," said Brooke Black, BTT's Florida Keys Initiative Program Manager. "We're combating it every day with continual research and conservation. We're getting a much better grasp of the dynamics of bonefish in the Bahamas and doing our best to translate that information to the Keys. Long story short: We need to tease out the fullest life history for bonefish if we plan on managing, conserving and fishing for them in the long term."

The biggest development in the Keys Initiative came not from the gin-clear flats, but from hours of crunching numbers behind a desk. Last year, BTT released a study that Keys flats fishing created an annual economic impact of $465 million, a nugget of info that raised eyebrows—and public awareness.

"Money talks in many ways and this piece of information allows us to support conservation science and effort with a

Capt. Steve Huff gives a fly casting demo on the IGFA lawn.

BTT Chairman Tom Davidson speaks (in background) during the Passing the Torch banquet.

Andy Mill gives a presentation on fishing for tarpon.

Ken Wright and Dr. Aaron J. Adams.

BTT Board Member Bill Klyn and Author Tom McGuane.

Artist Jorge Martinez at the Art and Film Festival.

Stu Apte, Meredith McCord, Steve Huff, Linda Denkert, and Bill Curtis.

BTT Board Member Harold Brewer and Cuban scientist Lazaro Vinola Valdes.

Fly tier Enrico Puglisi.

Artist Don Yoyi sells his creations to benefit BTT at the Inaugural BTT Art and Film Festival.

dollar figure that cannot be ignored," Black said. "Bone fishing is a conservation-minded activity with little environmental impact (catch-and-release, non-combustion propulsion, etc.) and brings millions of dollars into the economy, locally and federally. Such activities are hard to find, and this provides the leverage necessary to promote research and conservation."

Many locals believe there are more bonefish in the Lower Keys than the upper part of the fishery, but Black said her research has yet to confirm this trend.

"We're not certain if that is true," she said. "What is evident is that all areas of the Keys are experiencing some level of inconsistency in their bonefish populations; thirty shots one day, six the next. This inconsistency is a mark of a depressed population. BTT is conducting studies Keys-wide, Biscayne to the Marquesas, to better understand the population structure and its nature."

A presentation during the Bonefish Science Session.

Answers will take time, persistence and patience, attributes that are not easy to muster.

"Especially in this day and age, it's natural to desire answers immediately," Black said. "The bonefish decline did not happen in one day and it will take more than one day to sort it out. All the evidence points to a decline that's been happening for at least a decade, with notable shifts in between. Patience is a major factor in conservation and science. We don't want to waste resources by being flippant. Good research is thorough, timely, objective and cumulative. Regardless of how tough it may be to work out the kinks, we're dedicated to the cause."

The Symposium, which raised nearly $120,000, ended with a sold-out banquet Saturday evening. Three BTT members were honored for their service to conservation. Ken Wright won the Flats Stewardship Award. Perkinson won the Lefty Kreh Sportsmanship Award; and Tom McGuane won the Curt Gowdy Memorial Media Award.

Wright, the former chairman of the Florida Fish & Wildlife Conservation Commission, led an effort to make tarpon catch and release, and that legislation led to the end of jigging for the big fish in Boca Grande Pass.

"As the rule started to develop, in order to bring my commissioners along and to understand how important tarpon fishing is and has been in Florida and west Florida, in particular, I started reading a lot more about tarpon," Wright said. "Randy Wayne Wright, the author, gave me the *Ultimate Tarpon Book*. It was a book Randy put together that was nothing more than newspaper articles, excerpts from various articles starting from the first newspaper article about the first tarpon caught on hook and line all the way through articles by Hemingway and other famous people. It just created, in my mind, a real passion for the tarpon and tarpon fishing, and that coupled with watching the television filming of tarpon, these large female tarpon being drug around after having been, you know, flossed and put on display in front of TV cameras to be released to either die or be eaten by sharks, it just inflamed a passion for solving that problem."

Perkinson paid tribute to Kreh, the fly-fishing icon, who still writes and fishes regularly, even at the age of 88.

"He's dedicated to teaching," Perkinson said. "And he's still going strong."

McGuane, the noted author and screenwriter, thanked BTT for its work.

"This is a very determined group," he said. "I'm thrilled to have your recognition."

One of the final segments celebrated the film, Passing the Torch, an ode to conservation from anglers young and old.

"We don't have the resources we had 50, 60 years ago," Stu Apte said. "My good ole days of tarpon fishing have come and gone long ago. You might not realize it, but yours are here right now. Yes, they're different, but they are all yours. I hope you don't waste them with negative thinking. …You have my best wishes for more and bigger fishes."

Lastly, the American Fisheries Society presented Bonefish & Tarpon Trust with the prestigious Conservation Achievement Award for the Fisheries Management Section. This annual honor recognizes an organization's outstanding

Saturday evening silent auction.

Symposium Chairman Chris Peterson and BTT Board Member John Newman at Saturday's Silent Auction.

contributions to fishery conservation or fishery science.

So another Symposium is done. Harkavy couldn't help but smile as he assessed the growth of an event and an organization.

"I am proud. It's great to be surrounded by really passionate people," Harkavy said. "This year's event, the committee was strong. BTT staff cut their teeth on this event. I was wowed. I was just so pleased to see the great job that the staff did. On all fronts it was really, really impressive."

Jeannine Apte, Stu Apte, and Bill Curtis.

Fly tiers Peter Smith and Tim Blair of S.S. Flies.

MY ONE RELIGION:

AN INTERVIEW WITH

THOMAS McGUANE

JAMES BUICE
is a freelance writer and author
based out of…wherever

Photo by Val Atkinson

Thomas McGuane seems now a genteel, elegant uncle to Captain Berserko, his sobriquet in a time of rebellion and debauchery decades ago. At 74, McGuane retains the tall, slender build of the same man who in 1973 along with other literary notables including Jim Harrison and Richard Brautigan created one of the finest films capturing the essence of fly fishing for tarpon aptly named, "Tarpon". Since that time, McGuane has received numerous awards and accolades for his work in literature and conservation along with an induction into the National Cutting Horse Hall of Fame for good measure. This year, at the 5th International Bonefish and Tarpon Trust Symposium, McGuane garnered another honor, the Curt Gowdy Memorial Media Award for his work in significantly raising awareness for fisheries conservation. Following the Symposium, fellow writer and BTT supporter James Buice cornered McGuane to get his perspective on conservation, angling, and his relationship with the natural world.

JB When and how did you begin angling? Did you start with fly or progress into it later?

TM My dad was a fly-fisherman; so, that's how I started. I suppose I was ten years old at the time. Subsequently, I fished with all sorts of things, including hand lines. I still really like to fish with plug rods and get a thrill looking into my tackle box and scanning all the way from Devil Horse to Badonk-a-Donk. But basically I'm a fly fisherman.

JB Did you realize at the time of the movie, "Tarpon", that the resource would be in jeopardy or that the popularity of tarpon angling would reach the level it has today?

TM I may not have realized at that time that the resource was under as much jeopardy as it is. We fully understood that there was a problem with boat pressure at least 50 years ago. The population of the US has doubled in my lifetime and grasping the accelerated pressure of man on nature was hard to foresee until it was upon us.

JB What are your fondest or most memorable angling experiences during the early years in the southern Keys?

TM I had so many wonderful days in the Keys that it's a challenge to pick one. Certainly, my first permit off Loggerhead (on a 3/0 tarpon fly) is right up there. Before I had a boat, I used to drive to the flat on the Oceanside of Ohio-Missouri Key in the evening. Watching tailing bonefish coming in on the flood was an eternal thrill. Tailing mutton snappers behind stingrays on the flats west of Woman Key knowing they'd eat a ham sandwich if you could just make the cast. I'm lucky to have been there.

JB In your opinion, what are the most detrimental threats facing the shallow water fishery there (or anywhere for that matter)?

TM The threats I'm most worried about are loss of inshore habitat, especially mangroves, and boat traffic. Your passport won't solve this: you can run but you can't hide.

JB How do you view the benefit of organizations such as Bonefish and Tarpon Trust in relation to the conservation of shallow water fisheries?

TM Bonefish and Tarpon Trust has elected to pick up one corner of our tattered natural world and do something about it, something for us and something for the fish. Apart from serving our own specialized and idealistic wishes, such action—by letting our bat do the talking—has symbolic power and sets an example for others in the community. Our society's love of nature and animals has been obscured but it's still there. In the days of silent movies, all an actor had to do was give a cube of sugar to the horse and he was a hero for the rest of the film.

JB It goes without saying that all sportsmen should be stewards of the environment; proactively combating those seeking to upset the natural world. At what point in your life did you realize the importance of harmony in nature and begin considering the implications of man's impact on the environment?

TM I hunt and fish in order to be in greater harmony with nature. That has been the case since I started. I need something to keep me embedded in the natural world, even a game to play, and it's my one and only religion. It doesn't offend me to be a predator as long as I feel myself to be in a preordained relationship to the earth and its creatures. Anything that threatens nature threatens all we have but our capacity for delusion makes us think we can fix everything we ruin. People who fish without caring for the world that sustains fish are not only ignorant and irresponsible, they're not even fishermen. They're opportunists bent on entertainment.

Amen.

Spawning off the deep end:

How persistent research has helped to unravel some of the mysteries of bonefish.

DR. ZACK JUD
Department of Biology, Florida International University

A fishery is only as good as the habitats that support it, so habitat conservation is essential to the future of the flats fishery. While great strides have been made towards protecting "the big three" through legislation reducing or eliminating harvest, habitat protection has been slower to follow. Of particular concern are spawning sites, travel corridors, and juvenile habitats. Understanding how fish use these habitats is critical to conservation of the flats fishery. This is an account of a multiyear effort to understand the connection between bonefish home ranges and spawning sites.

Tagging studies in The Bahamas and the Florida Keys show that in large part bonefish are homebodies—most recaptures have been made within a mile or two of their original tagging site. It turns out, however, that bonefish make long-distance spawning runs a couple of times each year. Bonefish from a broad area seem to migrate to a handful of very specific spots to spawn. While these runs only last a few days at a time, they can take a bonefish far away from its home turf. Here's where the habitat conservation problem lies. Even if efforts are made to protect important bonefish foraging habitats—the places we like to fish —spawning sites and spawning travel corridors are often left vulnerable to development, pollution, and poaching. Although spawning sites are only used for a small part of the year, habitat loss or harvest here could affect bonefish populations across a very broad area.

Since 2010, scientists from BTT and our collaborators at the Fisheries Conservation Foundation, Cape Eleuthera Institute, Florida Institute of Technology, and University of Massachusetts Amherst have been working in Abaco, The Bahamas, to better understand when, where, and how bonefish spawn. Based on earlier BTT-funded research in Eleuthera and Andros, the story of bonefish spawning has slowly started to emerge. After migrating to a spawning site, bonefish gather in pre-spawning schools. In Eleuthera, these pre-spawning schools would stage in relatively shallow water that was immediately adjacent to a deep oceanic dropoff—always around a full or new moon. At night, the fish would migrate from the shallow staging area into the depths of the open ocean to spawn.

On the western side of Abaco lies The Marls, a huge network of shallow flats and mangrove cays. Encompassing more than 200 square miles of prime bonefish habitat, The Marls supports a world-class fishery, a huge part of Abaco's economy. Based on earlier observations in Eleuthera and Andros, bonefish from The Marls probably take one of two possible paths to their deepwater spawning grounds— the fish may swim straight to the west across the open expanse of the Little Bahama Bank to the edge of the shelf, or they may hug the shoreline of Abaco all the way to the southern end of the island, where water depths plummet to more than 3000 feet less than ¾ of a mile offshore.

Working closely with many of Abaco's guides, scientists focused in on what appeared to be a migration southward from the Marls to southern Abaco. Confirmation of migrating schools of bonefish near full and new moons, and sighting of large schools of bonefish at what appeared to be a spawning site initiated a BTT research team to begin a multi-year study to document the likely spawning site, confirm long-distance migrations between feeding and spawning areas, and document actual spawning behaviors.

The researchers relied heavily on tagging to achieve these goals. BTT had already established a successful tagging program in Abaco—more than 2,600 bonefish have been tagged on the island to date, mostly by members of the Abaco Fly Fishing Guides Association. These tags had been instrumental in identifying the home range of bonefish, but they also confirm long-distance spawning migrations: numerous tagged bonefish were captured from spawning aggregations that had been tagged in the Marls, and a number of the bonefish we tagged during our studies at the spawning site were recaptured by anglers and guides in the Marls.

But as part of this study we also employed a higher tech approach - acoustic telemetry. Small acoustic tracking tags were surgically

A pre-spawning school viewed from the surface. Photo by Cindy Pinder

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implanted into bonefish. Each tag emitted a series of ultrasonic pings unique to that fish, which were detected and recorded by an array of underwater acoustic receivers. By placing acoustic receivers around the possible spawning site at the southern end of Abaco, as well as along the potential shoreline travel corridor, it was possible to identify long-distance spawning movements without ever having to physically recapture tagged fish.

(left) Underwater acoustic receivers were deployed near the potential spawning site to "listen for" tagged bonefish. Photo by Dr. Zack Jud

(above) Surgically implanting an acoustic tracking tag into a migrating bonefish. Photo by Buddy Pinder

(left) Real-time acoustic tracking allowed researchers to follow tagged bonefish as they moved offshore to spawn. Photo by Alex Lovett-Woodsum

Acoustic tagging of Abaco's bonefish began in October of 2010. While the team of researchers had hoped to find the schools of fast-moving bonefish that were rumored to run southward along the outside edges of The Marls, a week of searching revealed no migrating fish. Instead, 14 fish were captured and tagged deep within The Marls. Then it became a sit-and-wait game while the tagged bonefish did their thing. When the underwater receivers were finally pulled to the surface and downloaded the following May, we had the data we were hoping for—one of the fish that had been tagged in The Marls the previous October had migrated all the way to the potential spawning area at the south end of Abaco, a round trip distance of at least 100 miles! What's more, the fish hung around that area from December 1-3, just two days before the new moon, which corresponds with earlier observations made in Eleuthera and Andros. But one fish just isn't enough to tell the whole story…

After observing a tagged bonefish make a potential 100+ mile spawning run in 2010, the BTT researchers returned to Abaco in the fall of 2012 to determine if large numbers of bonefish were also making this migration, and to confirm that the migration was all about spawning. Instead of tagging fish deep within The Marls as they had done in 2010, the team hit the jackpot in 2012, intercepting school after school of bonefish running south along the outer edge of The Marls.

The scientists surgically implanted acoustic tracking tags into 25 of these migrating fish. They also dart-tagged 600 additional fish from the fast-moving schools, hoping that guide-based recaptures in the Marls would link the migration corridor with home range habitats. In the final few hours of the final day of the 2012 research trip, the BTT team made an incredible discovery. While deploying underwater acoustic receivers near the likely spawning area, the scientists stumbled onto a school of bonefish that was at least 10,000 to 20,000 fish strong! The size of the school, along with the way the fish in it were behaving, convinced the researchers that they had found a pre-spawning aggregation.

The following spring, after the receivers were recovered, the BTT team was all smiles as they downloaded the data from the underwater receivers. Six of the acoustically tagged fish had migrated from The Marls to the potential spawning site in December 2012. The fish arrived between December 10th and December 16th, and stayed for 2 to 5 days. The new moon that year was on December 13th, right in the middle of the migration. One of the tagged fish made a second run to the south end of the island between March 6th and March 11th. It was no surprise to see that this run matched up with a March 11th new moon. As all of the pieces came together, it became pretty clear that bonefish were making multiple 100+ mile round-trip spawning runs from The Marls to a very specific spot at the southern end of the island each fall and winter.

With the discovery of a likely pre-spawning aggregation and the identification of multiple migrations between The Marls and the southern end of Abaco, BTT researchers returned to the aggregating site in the fall of 2013 to develop a better understanding of pre-spawning and spawning behavior in bonefish. The team used real-time acoustic telemetry ("active tracking") to follow fish within pre-spawn and spawning schools. With a directional receiver mounted to the bow of their boat, the team tracked the location and depth of acoustically tagged fish in the aggregating schools day and night for a week. They discovered that pre-spawning schools, numbering in the thousands of fish, would stage in 3 to 6 feet of water for several days prior to the spawn. As the full moon approached, these staging schools grew larger.

On the afternoon before the full moon, a huge school of bonefish —estimated to contain more than 10,000 fish—moved offshore from the shallow staging area into adjacent waters in the 10 to 30 foot depth range. These fish began to show the same pre-spawning behaviors that had been observed in Eleuthera—a hint that they were getting ready to make the run offshore to spawn. As the huge school swirled into deeper water like a living tornado, individual bonefish began bumping and nudging into each other. Just before sunset, the fish began porpoising at the surface,

Prior to spawning, bonefish schools stage in shallow water for several days. Photo by Dr. Zack Jud

gulping down mouthfuls of air. As the sun fell below the horizon, the porpoising suddenly stopped. The school, which had been milling around in 30 feet of water, dropped towards the bottom and began to quickly head offshore.

The research team tracked the school as it moved into deeper water. Within an hour, the school had gone from the surface to more than 180 feet, where it remained for 2 hours. Because the acoustic tags were only able to record depth down to the 180-foot mark, it's impossible to know just how deep the fish actually went during this two hour window. Water depth at the spawning site was more than 2,000 feet, although it's highly unlikely that the fish went that deep. Suddenly, after two hours at depth, the school rose from below 180 feet to 100 feet in less than one minute. This rapid change in depth—called a spawning rise—means that bonefish release their eggs deep in the water column. The researchers think that air swallowed during pre-spawning porpoising may expand as the bonefish rise through the water, acting to push eggs out all at once. Spawning at depth may play an important role in allowing bonefish eggs and larvae to drift back to appropriate juvenile habitats. After spawning, the school appeared to slowly head back towards shore, swimming along the bottom. By the next morning, the school that had been tracked offshore was gone, but other pre-spawning schools were still staging in shallow water, suggesting that spawning goes on for several days around each full and new moon.

After several years of hard work, a definitive link between The Marls' world-renowned fishery and a very small spawning site at the south end of Abaco had been established.

And a recent recapture of a tagged fish brings into question—from how far do bonefish migrate to spawn? One of the bonefish tagged on the southward migration in 2012 was recently recaptured on the north-central region of Grand Bahama Island, close to 150 miles one-way from the spawning site. If bonefish from such a large geographic area rely on this site to spawn, disturbance or habitat degradation at the spawning site, or along their spawning migration route, could affect the bonefish fishery across a broad area.

Unfortunately, the spot at the southern end of Abaco where bonefish aggregate to spawn has long been the target of potential development projects, including a resort, a deepwater marina, and even a limestone mine. Any of these projects could have catastrophic effects on the spawning aggregation. This is why the data from this study is being shared with the Bahamas National Trust, which is proposing to the Bahamian government the creation of National Parks to protect not only the home ranges of bonefish on Abaco and Grand Bahama Island, but also the spawning site.

Although this work has important implications for protecting the bonefish fishery of Abaco and Grand Bahama Island, BTT's broader goal is to use these findings to help identify and protect critical habitats that will help restore and conserve bonefish populations in other areas, particularly the Florida Keys. Moving forward, BTT researchers will continue working at this critical spawning site in order learn more details about spawning behavior and spawning habitat requirements so they can better identify and protect other spawning locations and travel corridors in the Keys and throughout the Caribbean.

The Florida Keys Initiative

No Small Challenge

DR. AARON J. ADAMS
is Director of Operations for
Bonefish & Tarpon Trust

Photos by Dan Dow

The Florida Keys Initiative is BTT's approach to a challenge that is four-fold:

1) Figure out what has caused the drastic decline in bonefish in the Florida Keys

2) Figure out a way to fix the problems

3) Restore the bonefish population

4) Keep tabs on and protect the overall flats fishery

It's not going to be quick—the bonefish population didn't decline overnight either—and it's not going to be easy, but we're making progress and have a strong strategy in place. This is an update on where we've been and a look into the future.

Establishing a Strong Foundation

The first order of business was to make sure we were on solid footing.

Fishermen tend to like big numbers, whether it's number of bonefish caught or the weight of a monster tarpon. So it's no surprise that $465 million—the annual economic impact of the flats fishery in the Keys—made a big splash when the data were released. This gave guides and anglers a launching point for touting the importance of the flats fishery, and it gave us leverage in our conservation and advocacy efforts because that economic impact is closely tied to the health of the flats fishery and habitats.

Another important step has been the Fishing Area Mapping process. Working with many guides and anglers in the Keys, BTT mapped the spatial dimensions of flats fishing effort, and overlaid these maps on habitat data. We've been working with Keys guides and anglers to use these maps to advocate for habitat and fisheries protections. For example, in response to a proposal to close an area entirely to protect seagrass habitats, why not make it a pole/troll/paddle zone? The Fishing Area Maps provide the information we need to make these recommendations.

The goals of the mapping effort are to ensure that flats anglers have places to fish in the future by protecting habitats, reducing user conflicts that impact the fishery, and using the catch-and-release ethos as a conservation tool. These data are being applied to numerous ongoing management plan revisions, including the Florida Keys National Marine Sanctuary, Everglades National Park, and Biscayne National Park.

We've also worked with guides, anglers, and the Florida Fish and Wildlife Conservation Commission on improving regulations. Bonefish and tarpon are now catch and release (although a tarpon can be kept with a special harvest tag if it is being submitted for an IGFA World Record), and the regulations promote proper catch and release handling practices. And the Florida Keys are now a Special Permit Management Zone, which has stricter regulations than the rest of the state.

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Combined, the economic study, fishing area maps, and new regulations have helped to make the flats fishing community an important player in conservation in the Florida Keys. This will greatly enhance the efforts of those in the Keys that have been advocating flats conservation for years, and provides a platform for launching more projects to address the challenges in the Keys.

Science for Conservation

One of the unknowns in the Keys has been the whereabouts of juvenile bonefish? In recent years, there haven't been many sightings of juveniles (bonefish about 6" long). In contrast, in interviews with longtime guides and anglers, we've been told about numerous places where they used to see juveniles.

We're now applying what we learned in the Bahamas to target areas in the Keys that should hold juvenile bonefish. The first year of sampling resulted in no juveniles, the second year we captured a few. We'll be repeating these efforts annually, and comparing the Keys results to the Bahamas as we work to determine the extent that problems with juvenile habitats may be contributing to the decline in the Keys bonefish population. Please let us know if you see juvenile bonefish!

With a lack of juvenile bonefish in the Keys, a logical question is—to what extent are juvenile bonefish coming from spawning that occurs in the Keys vs spawning that occurs elsewhere? We know that bonefish spawn in deep, open water, and that once the eggs hatch the larvae live as plankton in the open ocean for an average of 53 days. To what extent do these larvae ride the currents back to their parents' home range vs drift down-current to other locations? Although all conservation has a local component, if Keys bonefish are being spawned in other locations, then conservation in those areas is important as well.

To address this important issue, we've launched the Bonefish Population Genetics Study. This involves anglers and guides collecting fin clips from bonefish, which we use for genetic analysis. With this approach, we hope to determine how bonefish populations in the Keys are related to bonefish populations in other locations, like Cuba. And we're doing the same thing for tarpon (though we take a scale instead of a fin clip) because the same question applies to them. If you fish for bonefish or tarpon we can use your help.

We're also funding a project that will bring together decades of data on water quality, seagrass, and bottom organisms (the bonefish prey community), and match that against fishing patterns of guides and anglers over this same historical time period. Was there a spatial pattern to changes in the fishery that links these factors to the bonefish decline? Was there a particular time period in which more drastic changes occurred, and did this coincide with changes in the fishery?

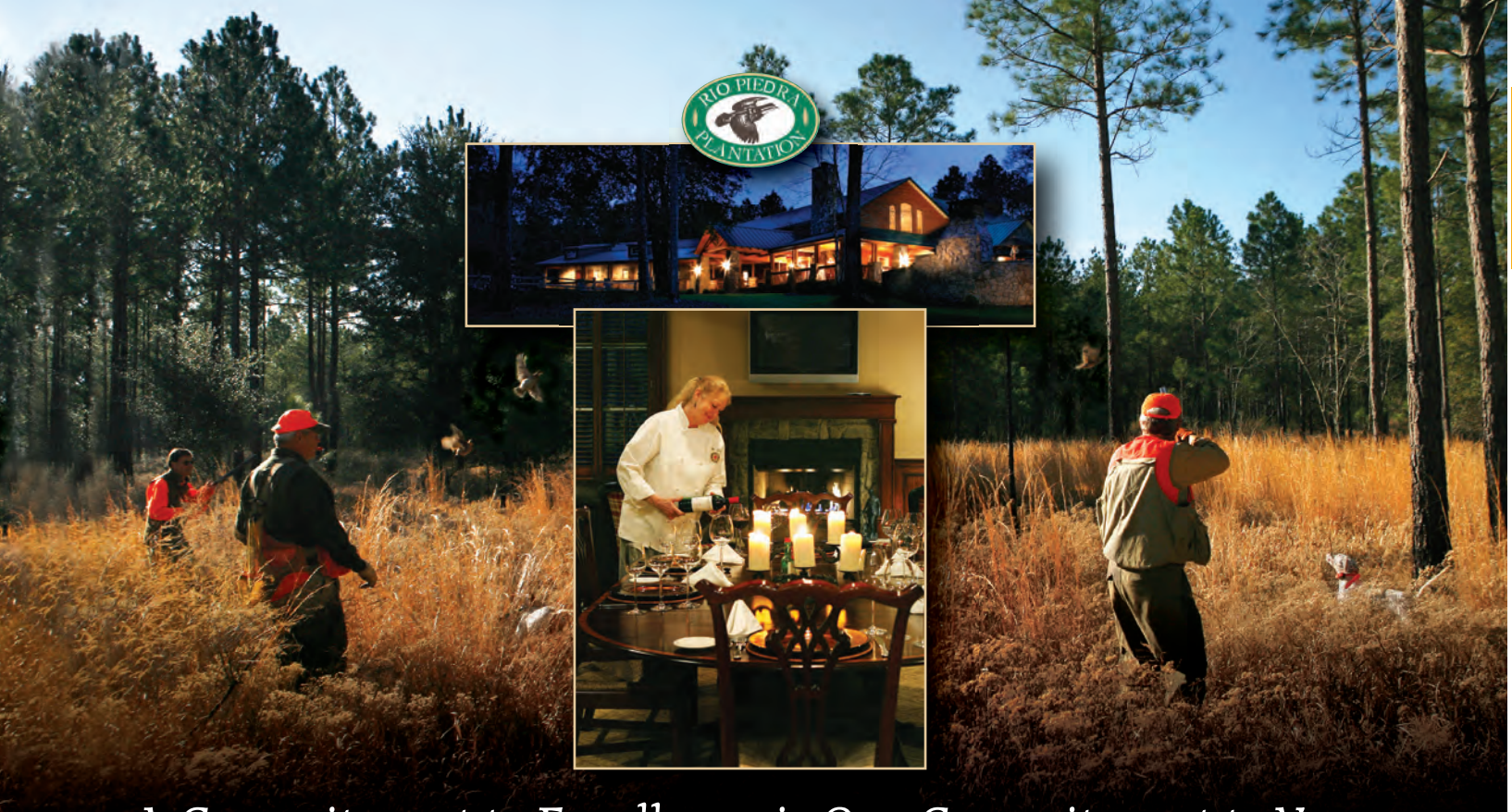
We're also funding a project that is looking for evidence of the impacts of pollutants, such as mercury, on bonefish. Mercury and other contaminants can cause genetic mutations that can be passed on to future generations and might impact fish survival, reproduction, and growth. If the study detects such mutations, it will give us a direction to pursue an important issue.

All of these projects are helping us to figure out the causes for the bonefish decline. Once we figure out the causes, we'll work with collaborators to develop fixes. But we'll also need to be ready to help give the bonefish population a boost.

With such a small population of bonefish, it may be necessary to give the bonefish population a boost toward recovery. The best way to do this is with a hatchery, used in the same way as was done for striped bass during their recovery—a few years of stocking to give the population a boost, and then step back and let the system do its thing. The problem is, we don't yet know how to spawn and raise bonefish in captivity, but we will soon be starting the important research needed to figure this out.

More to Come

We have many more projects ready to come out of the chute, all designed to give us the understanding we need to fix what is wrong, restore the fishery to the level that it once was, and to keep it that way for the future. Please watch the BTT Blog for updates, www.btt.org/blog.



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Tropical Beach Habitats

DR. AARON J. ADAMS
is Director of Operations for Bonefish & Tarpon Trust

Photos by Dr. Aaron J. Adams

Beaches of the Caribbean and tropical Florida differ somewhat from beaches of the Atlantic and Gulf coasts. The processes of waves and currents are similar, but the type of sand (mostly calcareous), the protection afforded by coral reefs, and the fact that currents on Caribbean islands are due almost entirely to wind and waves, make Caribbean beaches a little different. Even if you have experience fishing along the beaches of warm-temperate and subtropical regions, you'll have to adjust your strategy a bit for the tropics.

I like to break beaches into three categories, based on the amount of wave energy they receive: exposed, protected, and semi-protected. Each offers a different type of habitat to bonefish, tarpon, permit other gamefish and their prey. Understanding these differences will help you find more fish.

Exposed Beaches

Exposed beaches are usually on the windward coast and are areas of high wave energy. They are made of coarse sand, coral rubble, shell fragments, rocky, or various combinations of these materials The stronger the wave activity the coarser the sandy makeup of the beach. The slope of exposed beaches is often steep, and since so much sand is moved by wave energy and associated currents, the diverse bottom community that is often found in more protected areas is replaced by a short list of more hardy species. In these respects, exposed beaches of the Caribbean resemble beaches along the Atlantic coast.

Since relatively few bottom dwelling (benthic) species are able to tolerate these high energy environments, baitfish dominate the list of prey on exposed beaches. Higher energy beaches tend not to hold schools of baitfish close to shore, except perhaps during particularly calm periods. Instead, the small fish congregate just outside the surf zone. Numerous species of anchovies and herrings that make up these schools are easily imitated with streamer patterns. Tarpon are common visitors to exposed beaches, but tend not to hang around for extended periods. Instead, tarpon appear and disappear at irregular intervals, even if baitfish remain, the exact movement patterns are not fully understood. In contrast, once they find a spot they like, snook tend to stay put for a while. They prefer murky water over clear water. Just inside the edge of clear and murky water can be a hot spot for Caribbean beach snook.

Fishing on exposed beaches can prove difficult due to high winds and surf. Choose your days according to conditions. Days when winds are calm or blowing offshore, or when ocean swells are negligible are days when fishing exposed beaches is most enjoyable and safest, and when gamefish come closest to the beach.

Protected Beaches

In contrast to exposed beaches, protected beaches in the tropics are sheltered from waves by an offshore barrier reef or by a wide region of shallow water that break up waves. These beaches also tend to be protected from onshore winds, have more stable bottoms than exposed beaches, and tend to hold more prey. The stability often allows the establishment and growth of seagrass and scattered mangroves that support diverse communities. Even if seagrass isn't abundant, the stable sandy bottom of protective beaches tend to support a rich prey community.


Exposed Beach


Protected Beach

Prey: mojarra sardine silverside

Protected beaches often have lush seagrass beds ending right at the shoreline. Healthy seagrass beds that reach the shoreline bring this productive habitat right to the feet of wading anglers. Although these aren't the kind of beaches that resorts prefer to boast, these types of shorelines are fantastic for fly fishing and provide excellent habitat for tarpon, bonefish, snook, and even permit.

In areas with shallow sloping bottoms, you'll often find a thin strip of sand between the beach and the beginning of the grass bed, especially along semi-protected beaches with small but consistent surf. The lower edge of this strip of sand indicates the low water mark and the area where the small surf stirs the sand. In many cases, minor wave action has carved out a slight depression in this sand strip, and this slightly deeper indentation can hold baitfish, juvenile fish, and crabs. Bonefish often like to cruise this strip of open bottom in search of prey.

In general, very shallow seagrass beds that abut beaches have a less diverse community of organisms than do deeper grass beds, and often fewer resident fish species. Mobile prey such as swimming crabs and small fish may be more important prey items for gamefish along these shallow grassy shorelines. This is in part because the shallower areas can be harsh environments. For example, the shallows can become very warm and very low in oxygen during calm, summer periods, and during extremely low tides can be completely exposed to air. This phenomena creates intolerable conditions for many species that aren't mobile, like clams and worms. Species that are best able to tolerate these conditions, or easily move in and out of these areas as conditions allow, are most adapted for these habitats. Prey types that are of interest to fly anglers in shallow seagrass beds include swimming crabs, hermit crabs, mojarras, and mullet.

mullet

mole crab

swimming crab

When you are on a protected beach, examine the landward portion of the beach for signs of land hermit crabs. A set of parallel walking tracks on either side of a drag mark (from the heavy shell it carries on its back) is evidence of a hermit crab's presence. Other crabs on the beach, land crabs and ghost crabs, leave only the walking tracks. The land-dwelling hermit crabs will sometimes forage along the water, and will search the shoreline looking for new shells to move into. They are most active at night, but can be found lingering near the water's edge at dawn. A permit or bonefish foraging along a shoreline may fall for a well-placed fly imitating a hermit crab out of its shell. In addition, these same shorelines are home to marine hermit crabs, which are also important prey for gamefish.

In addition to bonefish, barjacks, snappers, and barracuda are the most common gamefish on these shallow shoreline grass flats. But if there is rocky bottom near shore you might also find permit, especially on a rising tide. Large barracuda sometimes lay in wait in depressions in the sand just off the shoreline and will make a meal out of needlefish and half-beaks that cruise along these shallow shorelines. These large barracuda are especially wary so it's important that you sight and cast to the fish from at least 60 feet away. Usually, you only get a single well-placed cast or two before the barracuda realizes something is amiss and moves off.

My favorite strategy for these shallow, grass-lined beaches is to walk slowly along the beach, with the sun at my back, looking for bonefish that are cruising along the shoreline searching for food. Walking along the beach allows me to have a higher vantage point, so I can see approaching fish better from farther away than if I was wading on the flats. I am also able to backtrack along the beach to get a second shot at a fish that refused or didn't see my initial offering. By stooping to keep a low profile and backtracking along the beach, I once was able to try three different flies on a group of three bonefish before I finally got a take on a large crab pattern.

Protected shorelines provide great opportunities for using lighter weight fly rods. My favorite rod for fishing protected beaches is a nine-foot six-weight. On protected shorelines it is often a long way to any substantial structure, such as reefs or rocks, so even if you connect with a strong fish it is unlikely to run into structure and break off. And since you will often be casting small, lightly weighted flies, a six-weight rod is perfectly matched to the flies and conditions, and makes for an easy day of casting, of course conditions permitting.

Semi-Protected Beaches

Beaches that are protected much of the time but receive strong surf multiple times a year, or experience small but consistent surf. These semi-protected beaches tend to support higher abundances of prey than fully protected beaches, in part because the occasional wave energy that washes these beaches also mixes the water column and keeps the bottom waters from becoming depleted of oxygen. This maintains a diverse benthic community. Because of this dynamic situation, semi-protected beaches can offer the most varied fly fishing opportunities.

The bottom of semi-protected beaches slopes quickly off , either to a deeper grass bed or to open sand bottom. Since sight-fishing is tough in these conditions, it is doubtful that you will sight and cast to a fish that is feeding on the deep bottom. In this habitat, flies that mimic moving prey, such as streamer imitations of baitfish or juvenile reef fish, are most effective. Tarpon like to cruise these beaches, as do permit. Tarpon often corral schools of baitfish against these beaches. Bonefish are also here, but are tough to spot in the deeper water. Other gamefish present along these beaches include barjacks, horse eye jacks, barracuda, and snappers. Don't be surprised if you catch a bonefish on a streamer, as they will take advantage of vulnerable baitfish and will feed on rather large baitfish along these shorelines.

Along semi-protected sandy beaches with small surf and a sandy bottom, bonefish will often forage just below the drop-off at the shoreline. They will also ride the small surf up into the swash zone in search of prey such as small crabs, shrimp, and small fish. Small shrimp or baitfish imitations, like a Gotcha, small Clouser, or Crazy Charlie are good flies for this type of fishing.

Semi-Protected Beach

Mole Crabs

A couple of interesting prey species occur on semi-protected Caribbean beaches with consistent wave action. If wave action is not too rough, bonefish, permit, and other gamefish will cruise along the beach, riding the wash in and out, and readily slurping up mole crabs. Common species of mole crabs in the Caribbean include Cuban Mole Crab, Common Mole Crab, Puerto Rican Mole Crab, and the Purple Surf Crab. There are several mole crab fly patterns made of wool, chenille, spun deer hair or a combination of these materials. Choose weighted patterns designed to ride on the bottom. Small, heavily-weighted, tan Clousers are also productive. It is rare that I use a sinking line when fishing shorelines in the Caribbean, but dredging the bottom with a mole crab pattern on an exposed beach is one of those rare occasions. A sinking line with a short leader will allow you to fish the fly so that it bounces along the bottom, making a good imitation of a mole crab.

Even if you have experience fishing along the beaches of warm-temperate and subtropical regions, you'll have to adjust your strategy a bit for the tropics.

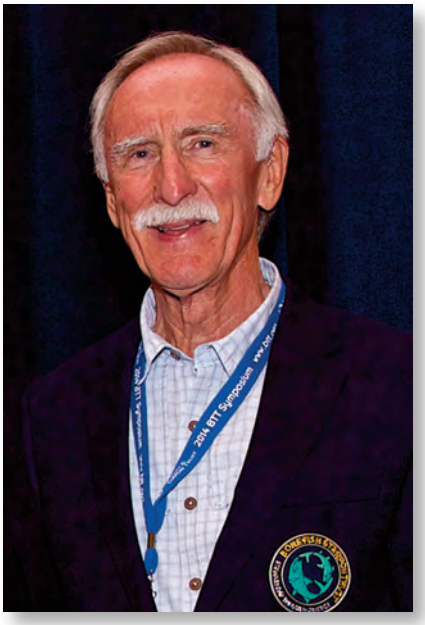
Baitfish

If you are lucky, you may come upon schools of baitfish moving back and forth along beaches, especially in larger embayments. Often, smaller fish species (like anchovies or dwarf herring) will be closer to shore and larger species (like herring) will be farther off the beach. However, this pattern may change depending upon how active predatorial fish have been. For example, I have seen schools of large sprat packed tightly against the shoreline when tarpon are present. Finding these baitfish schools is not always easy because they blend in very well with their surroundings, are often well below the surface and can be somewhat scattered if they are not being actively pursued by predators. Often these unmolested baitfish schools appear as shadows over the bottom. If baitfish schools are near the surface and packed tightly together, tarpon may be nearby. Even if no obvious predators are visible, it's still worth a few casts since tarpon and other gamefish sometimes stay in the vicinity of baitfish schools even if they are not aggressively feeding.

I like to walk large, semi-protected bays looking for signs of baitfish. If I find baitfish, this is where I concentrate my efforts. It also pays to watch for pelicans diving for baitfish in a concentrated area, as this is usually a sign of a school of baitfish that is being harassed from below by predatorial fish. While it is common to find jacks and barracuda eager to take a fly from midmorning to midafternoon, it is morning and evening that generally fish best for tarpon.

Russ Fisher

MIKE HODGE
is a freelance outdoor writer
who lives and fishes in Florida



Russ Fisher has been with Bonefish & Tarpon Trust from the beginning. It was 15 years ago when a handful of anglers founded the conservation group. Faces have come and gone, but Fisher's commitment never strayed.

In the early days, he organized events; now the Key Largo, Fla. resident is BTT's Vice President of Research, the man in charge of helping us all figure out why fish do what they do.

"I love the species. I love to fish in general, bonefish in particular," Fisher said. "I actually learned how to fly fish going after tarpon. I did that a lot in my younger days. Now there's something more elegant to me about a bonefish. Everyone has their species of the (Big) Three. But it really hasn't changed from day one as far as the need to understand what these species are doing. Very little science was done before BTT. And there's still not enough yet. The job is far from over."

BTT has increased its staffing and fundraising incrementally the past few years and has been instrumental in enacting state legislation protecting bonefish, tarpon, and permit, accomplishments that have been celebrated, but not dwelled upon. Issues still remain. "From the beginning it was always felt that science had to be the basis for progress," said Fisher who graduated from Cal-Berkeley and received an MBA from Harvard before working in the textile business. "So little was and is known about the three species that the early focus was just about trying to raise money to be allocated among the most important studies. In going down this road, the awareness of these species importance both to the sportsman and to the economy has been elevated. They have been neglected, and that is changing with BTT's help. We are just now being more of an advocate for regulatory action as a result of some of the evolving science. BTT can be an advocate for the protection of the species while still allowing sportsman the ability to enjoy fishing for them. These are not mutually exclusive."

Fisher prefers to evaluate issues in terms of challenges rather than obstacles. The biggest hurdle looms in the Florida Keys, hence the birth of the Florida Keys Initiative, one of BTT's primary projects along with the Bahamas Initiative.

"Our biggest goals are to sustain the (bonefish) populations that are pretty healthy, like the Bahamas," Fisher said. "That's pretty healthy right now. We want to be an advocate to protect that. This organization was formed in the Florida Keys. We have a problem. No one else is going to solve it is but us. That may be a little bit naïve. The state of Florida has limited funds and many tasks to perform, so it's up to us to try to solve this problem, if it can be solved."

The obvious solution starts with money and patience. Research requires money, but it also takes time before scientific results can be culled. Answers rarely arrive overnight.

"The first Keys specific project was the analysis of the food source (for the bonefish) that Audubon did for us," Fisher said. "What that said was, well, there's food. There may not be as much food as there was 30 years ago, but there's enough food for there to be more bonefish than there are. We have multiple projects underway that amount to a lot of money, a lot more than we've been spending."

Meanwhile, BTT continues to chip away at the problems that threaten the game fish we love to pursue. In fact, some of the premier scientists met the day after the 2014 Symposium. "The most exciting thing about this weekend is the meeting on Sunday," Fisher said as Day Two of the Symposium finished up. "We'll have a closed-door meeting with a dozen scientists in there for them to intellectually debate what are we not doing that we should. I believe if you get a dozen bright minds together, they'll think of things that they might not have thought about by themselves."

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Cuda Concerns

BROOKE D. BLACK
is BTT's Florida Keys Representative

Photos by Pat Ford

We all know the Great Barracuda.

Most of us have caught plenty. At some point along the way, we may have under appreciated them because they weren't the intended target or one nipped at a leader knot when a bonefish finally ate and ran. Although we may have had a run-in with a barracuda, we all, as anglers, still respect them. Barracudas have qualities a recreational angler values—speed, strength and visibility. How many times have you amped yourself up on the flats when you've seen small group of bonefish at first glance, only to find it was a school of laid-up barracudas? They are an integral part of the shallows and as an apex predator, their importance extends into many more habitats. They contribute to a high-dollar recreational fishery that provides leverage for habitat and fishery conservation. These days, we're seeing far fewer of them in South Florida and their decline on the flats has been eye-opening for seasoned guides and anglers.

For a couple of years, brief comments would pop up in conversation about the lack of barracudas on the flats. Some anglers would add that they haven't seen many since the 2010 winter fish kill. Others would say that they have been watching barracudas slowly decline for decades, perhaps like some of our more revered species. Regardless of how fast barracuda numbers have declined, the depressed population has led to a coalition for conservation in the angling community. Brief comments about barracuda declines became extensive discussions, both locally and regionally. In short, South Florida is asking, "what's going on with our barracudas?"

Regardless of how fast barracuda numbers have declined, the depressed population has led to a coalition for conservation in the angling community.

BTT reached out to fishermen, guides and scientists and a common theme arose: under-regulated commercial and recreational fishing. So BTT took a look at the Florida state regulations for barracuda. Our findings indicated that for all intents and purposes, there are no regulations. What is currently in place for barracuda, an "unregulated" species to the Florida Fish and Wildlife Commission (FWC), is a default recreational bag limit which is defined as commercial quantities; 100 pounds or two fish, whichever limit is reached first. Many guides would argue that barracuda on the flats are generally smaller and it would be difficult to catch two fish worth 100 pounds. On the commercial side, FWC indicates an increase of 65% by 2012 in commercial landings for barracuda.

The resounding issue is one with which we are familiar: a lack of data. We know very little about barracuda life history and general population dynamics. The information we have is anecdotal, but that doesn't make it insignificant. At the November 20, 2014 FWC meeting in Key Largo, public comments by guides, anglers, BTT scientists and conservation-

minded groups such as KeysKeeper, highlighted the anecdotes echoed by the angling community to shed some light on the issue and implore the commission to set more stringent regulations for the sport fish. In turn, the commission agreed to host a series of workshops in the Keys to pinpoint the barracuda issues and hopefully direct deeper investigation and regulations. It is our hope that before the barracuda population reaches an irreversible decline in South Florida, precautionary management measures are taken to protect the current numbers and help the population recover.

> "Every experience I have had with a barracuda has been great, going back to when I was a kid. They have teeth, pull hard and jump!"
>
> **— Capt. Duane Baker**

After all, barracuda are formidable adversaries that deserve respect. As noted by Capt. Duane Baker, "Every experience I have had with a barracuda has been great, going back to when I was a kid. They have teeth, pull hard and jump!" We recognize barracuda as great sport fish and an important part of the flats ecosystem, and it's time to put measures in place to protect them.

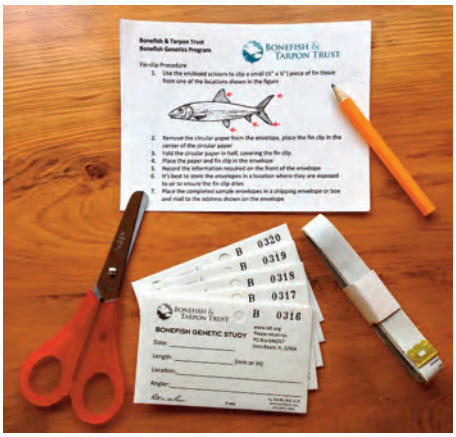
The Puzzle of Regional Proportions

DR. AARON J. ADAMS
is Director of Operations for Bonefish & Tarpon Trust

Photos by Dr. Aaron J. Adams

Todd Fuller, of Hell's Bay Boatworks, holds a tarpon scale.

One of the questions by anglers fishing for tarpon has been: "Are our fish also their fish?" In other words, are the populations of tarpon in one location connected to tarpon in other locations, and how should this influence conservation? A longstanding question for BTT, this remains a valid and important question for tarpon conservation. But it is only part of a larger issue that applies to bonefish and permit as well—to what extent is conservation local vs regional?



Bonefish fin clip kit.

That original query focused on adults and whether they were capable of long-distance migrations that connected fisheries in different locations. Indeed, the satellite tagging data show that some tarpon do undertake long-distance, seasonal migrations, and as such are potentially part of fisheries in different locations. But migration by adults is only one way that fish populations can be connected. Fish populations can also be connected by the transport of larvae by ocean currents, which brings bonefish and permit into the mix.

We know that bonefish, tarpon, and permit spawn in deep waters far from their flats habitats. Tarpon spawn offshore near full and new moons during summer. Bonefish spawn off of deep drop-offs at night during full and new moons during winter. Permit spawn near reef promontories or artificial reefs, with peak spawning during late spring and summer.

In all cases these species follow a strategy of reproduction called "broadcast spawning", a technique whereby large schools of mixed males and females eject (broadcast) their eggs and sperm into the open water, the eggs are fertilized, and once hatched the larvae float in the open ocean for weeks (the exact length of time depends on the species). These larvae might circle around in an ocean gyre that delivers them back to near where their parents' live, or might carry them long distances away from that location. By virtue of the fact that some larvae are delivered back to their parents' location, the population could be considered "self-supporting". The extent that larvae are transported to other locations reflects the amount of "connectivity" among local populations.

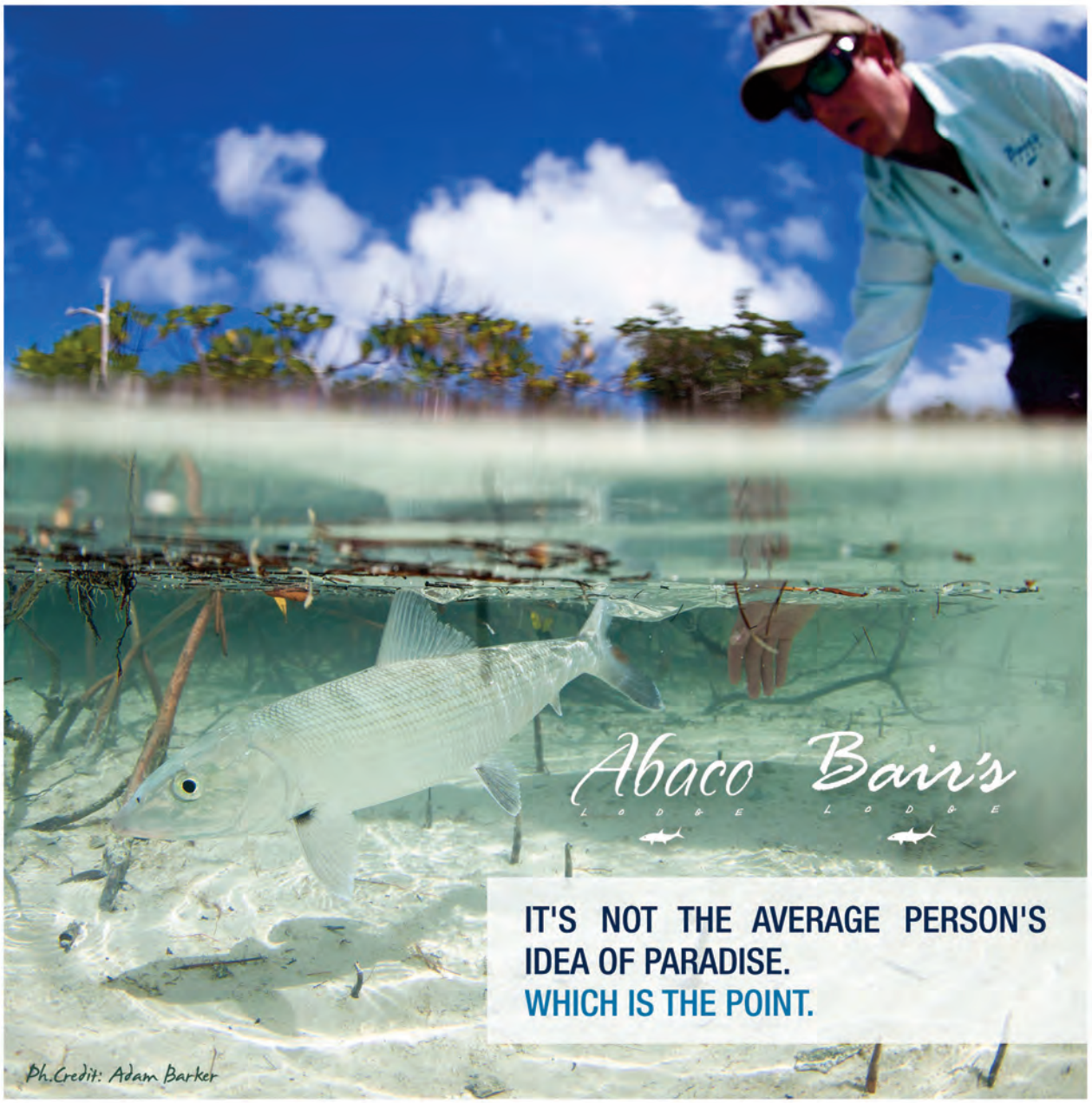
The goal of the Bonefish and Tarpon Population Genetics Programs is to determine how much bonefish and tarpon populations are connected vs self-supported. (A permit population genetics project will begin in the future.) The Genetics Programs will work this way: anglers and guides will collect fin clips from bonefish and scales from tarpon using kits provided by BTT; they will then send the samples to BTT, and we will work with collaborating genetic scientists to analyze the samples to determine the level of connectivity among bonefish and tarpon populations throughout the region. If we successfully collect enough genetic samples from enough places, we will have a better idea of the mix of local and regional conservation that is needed.

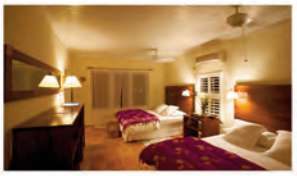
The challenge is collecting enough genetic samples from throughout the geographic ranges of bonefish and tarpon in the Atlantic Ocean, Caribbean Sea, and Gulf of Mexico. This is where you come in. If you fish for bonefish and tarpon, we need your help. We are asking anglers and guides to collect fin clips from bonefish and scales from tarpon. We use the skin from the fins and from the scales for genetic analysis. You can make a difference.

ARTIST OF THE YEAR

Mike Stidham

When you look at a painting by BTT's 2015 Artist of the Year, Mike Stidham, it is easy to see why his creations are held with such high regard among art collectors. His time on the water as a fishing guide on Idaho's Snake river, along with years of chasing many other game fish, have given Mike the ability to dramatically depict our favorite species so accurately that it seems he has stolen the images straight from our fishing dreams and presented them to us on canvas. One of the finer details that make Mike's paintings so alluring is his use of light. Accurately recreating the refraction of light underwater adds a depth to his pieces that can only be replicated by an artist with a true understanding of the underwater environment. Mike's paintings and other artwork have been featured in numerous outdoor publications and that stands as a testament to this self taught painter's natural talent.





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PROJECT: Belize

DR. AARON J. ADAMS
is Director of Operations for Bonefish & Tarpon Trust

Photos by Dr. Aaron J. Adams

Like most places where we fish the flats, the Belize flats fishery has challenges that must be addressed to ensure a healthy future for the flats fishery. The encouraging thing is that, like many other locations, the guides and lodges of Belize are organizing to address these challenges. The momentum behind the renewed effort toward fishery conservation was reflected in November 2014, during the first Belize Flats Fishing Summit.

The Summit brought together more than 40 guides and lodge owners from throughout coastal Belize, from Punta Gorda in the south to San Pedro in the north, and points in between. The guides came together to discuss the challenges in their home waters and to find a common theme moving forward toward better national management of the flats resources.

The summit was much needed. During my travel in Belize, and conversations with guides and lodge owners throughout the country, it was apparent there was a strong and growing concern among those in the fishery that something had to be done, and soon. The most amazing thing was that the perceptions of the guides and lodge owners about the top threats to the flats fishery were the same. What was missing was a national conversation.

The common views on threats to the fishery were readily obvious at the summit. A representative of each of the regions of Belize—north, central, south—gave a brief presentation about the top threats and concerns in their region. Although none of the speakers had compared notes, they each reported the same top threats: gillnets (which they want banned), lack of enforcement of existing laws and habitat loss. The regional presentations were quickly backed up by comments and discussion by their fellow guides. The personal accounts were compelling. I think many were surprised to find that others shared their experiences, which helped the group quickly reach a plan for moving forward.

The result of the Summit was that the guides and lodge owners began the process of creating a national-level association to represent their concerns with the government of Belize. A small group was nominated by those at the summit to start working on formulating specific goals, objectives and a strategy for the new association that will address threats to the fishery and propose solutions. This is an important first step.

BTT will continue to work with guides and lodges to conduct the scientific research needed to support flats fishery conservation and provide advice as requested. I know that Jim Klug of Yellow Dog (a sponsor of the summit, along with the Radisson hotel in Belize City) and I were both impressed with the forward-thinking of the guide community and have high hopes for the future of the Belize flats fishery.

Moving Forward

Information critical to the efforts of the guides and lodge owners in Belize includes identification of important habitats. We are addressing this in part through a tag-recapture program. Guides and their anglers are tagging bonefish and permit so we can identify their home ranges. Although the process is slow, the information is important enough that we have to remain persistent.

We are now planning to enter a new phase—identification of spawning locations for permit and bonefish. The first step is conducting interviews with long-time guides, but more important, we will be interviewing commercial fishermen and SCUBA divers who spend a lot of time on the barrier reef that lays offshore. Based on our general knowledge of permit and bonefish spawning, both species spawn on the outer edge of the reef or beyond—permit at reef promontories, bonefish off the edge.


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Punta Gorda, in southern Belize, and the local permit fishing grounds.

Pancake flats are permit feeding grounds.

Up first is permit. Goal one is to identify possible permit spawning locations from these interviews and conduct surveys at permit spawning times (seven days after the full moon between March and October) to determine if reports of large aggregations of permit are correct.

Goal two is to determine where the permit that use these spawning locations come from. We'll address this using acoustic tracking: We will capture permit on the flats and implant them with an acoustic transmitter (aka sonic tag); we will place acoustic receivers to listen for the tags at the identified spawning locations. This will give us an idea of how far permit travel to spawn, whether they use the same spawning location each time they spawn or use multiple spawning locations and demonstrate the connections between the flats spawning. This information will be used by the guides and lodges to identify spawning areas for protection.

Up next will be bonefish. Stay tuned.

If you fish in Belize and want to contribute or take part, please let us know.

Guides at the National Flats Fishing Summit in Belize City.

Sunscreen and slime– Bonefishing is a Messy Business

KELLY HANNAN,
AARON SHULTZ,
ZACH ZUCKERMAN
Cape Eleuthera Institute,
Cape Eleuthera, Bahamas

CHRIS HAAK
Department of Environmental Conservation, University of Massachusetts Amherst

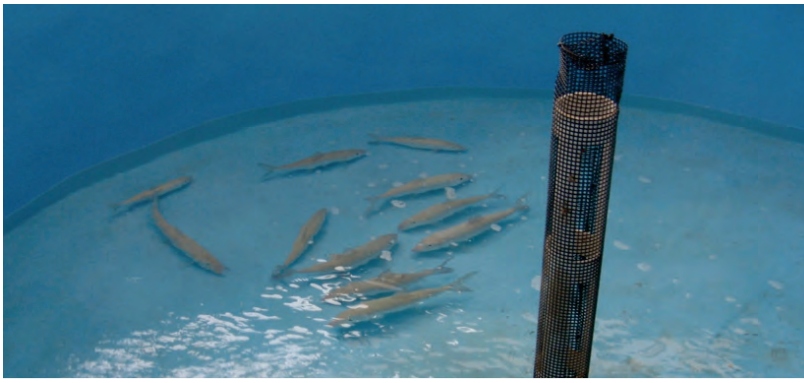
Bonefish rely on their eyesight more so than olfactory cues to find prey.

Most bonefish anglers voluntarily implement catch-and-release practices, supporting a $140 million industry in the Bahamas alone. The economic value of this fishery has prompted research on the effects of catch-and-release angling on bonefish, yet despite a growing understanding of angling-induced impacts on the physiology and post-release behavior of bonefish, gaps in our knowledge of best handling practices still exist.

Angler-perpetuated myths are as common as any good fish story, and some are staunchly believed. Take the idea that sunscreen, for example, is thought to add a scent or flavor to a fly that is unfavorable to bonefish, reducing the likelihood that a fish will eat it. Perhaps not surprisingly, no quantifiable evidence exists to support the notion that bonefish show an aversion to flies that have been handled with sunscreen, yet many otherwise-serviceable flies have doubtlessly been retired as a result of this belief. On the flip side, anglers don't often consider how the chemicals in sunscreen might affect the health of a fish that has been handled with sunscreen-coated hands. Despite the fact that large doses of sunscreen have been documented to feminize male fish in other species, cause bleaching in corals, and trigger a plethora of other harmful effects to marine life. Today's angler has many alternatives to traditional sunscreens: UV-blocking gloves, shirts, buffs, hats, and more are all available to limit exposure to harmful UV rays while on the water. While such products are effective, very little information exists on how UV-blocking gloves might also affect a fish after handling. Researchers at the Cape Eleuthera Institute (CEI) set out to assess: 1) whether bonefish do show an aversion to sunscreen-contaminated baits, and 2) how do sunscreen products and UV-blocking gloves affect fish health following handling?

To first address the tale that fish are less likely to consume bait contaminated by sunscreen, bonefish were collected from nearby flats and held at CEI's wetlab for a series of observations on their feeding behaviors. Experimental trials consisted of supplying bonefish with shrimp handled with oxybenzone-containing sunscreen (conventional sunscreen), zinc-based sunscreen, or clean wet hands. Researchers observed how long it took a bonefish to bite and spit the bait, and measured the total weight of treated shrimp consumed. Results indicated that bonefish feeding behavior was unaffected by the addition of conventional and zinc sunscreens to the bait, and fish were neither attracted by nor dissuaded to consume contaminated bait. They didn't consume a different amount of shrimp when sunscreen was

Angler handling a bonefish for a picture. Replace with gloved hands if possible.



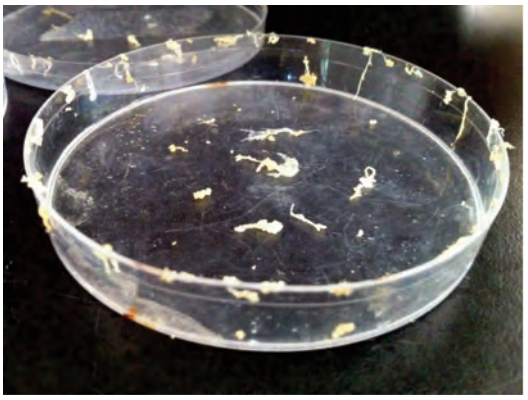
Bonefish acclimate quickly to a lab setting. Bonefish here are held before being separated into tanks for individual observation.

added and the time of their first bite did not change. Considering that bonefish rely primarily on their eyesight to identify prey, these results may not be surprising. Anglers should be more concerned with their choice of fly than what they last touched when it comes to hooking fish, but what about handling?

To examine the effects of handling a fish with contaminated hands, researchers simulated an angling event in the lab; fish were exercised via tail grabbing (a standard technique) around a large tank for 4 minutes, then handled and air exposed for 1 minute to simulate hook removal. Prior to handling, researchers coated their hands with either conventional oxybenzone-containing sunscreen, zinc-based sunscreen, donned UV-blocking gloves, or had clean wet hands. Mucous removed by the researcher's hands was weighed and recorded. Mucous, otherwise known as a fish's slime layer, is the first line of defense for a fish, and slime removal is known to increase the likelihood of infection in fish, which in extreme cases can result in post-release mortality. Results suggest that oxybenzone containing sunscreen removed significantly more mucous than zinc-based sunscreen, gloves, or wet hands, and wet hands resulted in the least amount of mucous lost across all treatments. Throughout the duration of the experiment, only two fish displayed evidence of bacterial infection following handling, and both fish were exposed to the zinc sunscreen treatment. Based on these results, anglers should consider avoiding handling of fish with sunscreen-coated hands, as well as with UV gloves. To best protect oneself from the sun with bonefish welfare in mind, rely on UV-blocking gloves, but remove them before handling a fish. Keep the bonefish in the water to avoid excess air exposure, and ensure your hands are wet to minimize mucous loss.

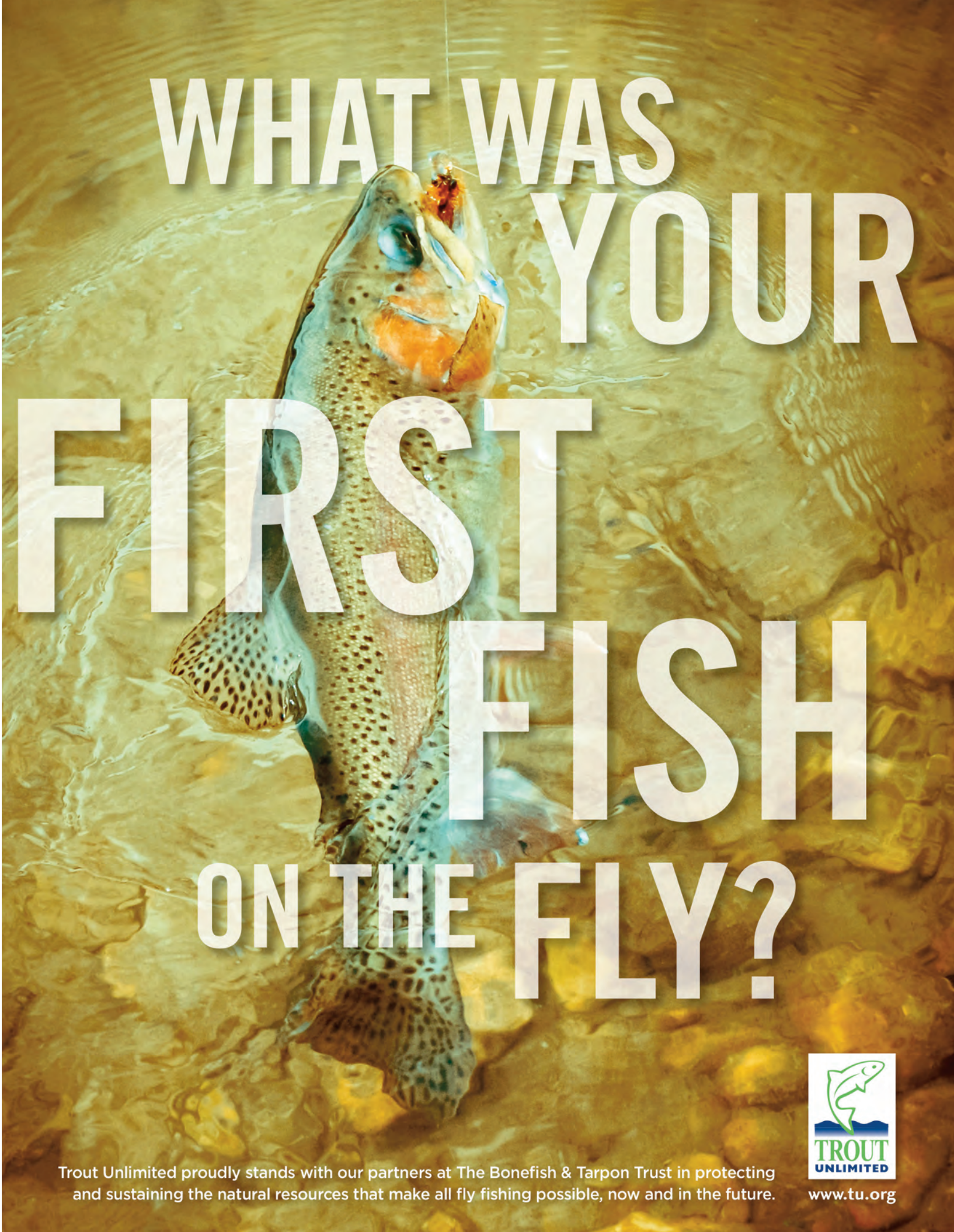
While sunscreen may not deter a fish from picking up your fly, this study demonstrates that anglers need to be cognizant of minimizing contact with a fish's slime layer. Even if a released fish looks healthy, mucous loss from handling can result in infection, behavioral changes, and a higher likelihood of post-release mortality. It is also important to consider the effect of sunscreen on the environment; nearly 6,000 tons of sunscreen is estimated to wash off swimmers annually, with negative impacts on corals, marine invertebrates, and other fish. Next time on the flats, minimize the risk to bonefish and their surrounding environment by limiting the use of sunscreens, and be sure to utilize best handling practices.

A bacterial infection after handling the fish with hands coated in a zinc-based sunscreen.



Slime, or mucous, is a bonefish's first immunological line of defense, much like your own skin. Excess slime loss can leave a bonefish susceptible to bacterial infection and subsequent post-release mortality.

This project was supported by the students and staff at the Cape Eleuthera Institute and Island School. The generous grant support from the Cape Eleuthera Foundation to the Cape Eleuthera Institute made it possible to conduct this research. Stay up to date on research projects at the Cape Eleuthera Institute by visiting the CEI website (www.ceibahamas.org) and blog (www.blog.ceibahamas.org).



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Al Perkinson

MIKE HODGE
is a freelance outdoor writer
who lives and fishes in Florida

Imagine what Al Perkinson must have felt like. One moment, Stu Apte passed by. Then it was Andy Mill and Mark Sosin followed by Tom McGuane and Steve Huff. The soft-spoken, white-haired gentleman was surrounded by angling greatness this past November during two fruitful days of discussion at the 5th Bonefish & Tarpon Trust Symposium, an event that allowed for a bit of reflection.

"Early on I was a huge fan of Flip Pallot, Curt Gowdy and Chico (Fernandez)," Perkinson said. "I was enamored with what they did and how they fished, how they presented it. It made me want to do that as soon as I got older to fish for bonefish, tarpon and permit and get involved. That's when I got involved with Bonefish & Tarpon Trust. I think it was Bonefish Unlimited at the time. As I saw people who were involved in it, they were all my heroes. They were protecting the thing I loved the most. I felt I needed to get involved and support it any way I could."

Once a fan and a follower of fishing fame, Perkinson is now an industry leader. The Vice President of Marketing at Costa Del Mar forged a partnership with BTT to create a permit tagging program in Florida. Project Permit is in its fifth year and still going strong. But anyone who has ever toyed with the elusive quarry knows that these fish don't always cooperate, even for the sake of science.

"We're not recapturing as many fish as we need to," Perkinson said. "We're getting a lot of fish tagged. We're not recapturing them. Everyone, if you catch a permit, if you get a tag, send the information into BTT, so they can track it. These fish, they travel. Their habitat is not just the Florida Keys. We're extending the program into the Yucatan and into Mexico and into Belize. We're really trying to get the Belize program up and running right now."

Perkinson, who won BTT's Lefty Kreh Sportsmanship Award, considers himself a permit fanatic. His favorite haunt? The Blue Horizon Lodge, home of Lincoln Westby, a fellow permit chaser.

"It's a really complex fish," Perkinson said. "There's just so many factors that affect its behavior. The environment that they live in is really amazing. The people that pursue it are obsessed, crazy people. All of those things come together. You can do everything right and still not catch it. It's a very skittish fish. You can get the fly there and you don't know if it's going to turn this way or that way and you miss it."

Landing permit takes teamwork. The guide has to find the fish and get the skiff into position. The angler has to make the cast, set the hook and land the fish. The same is true in conservation, where groups and individuals have to mesh for the greater good.

"We're all in this community together," Perkinson said. "A community consists of a lot of different groups. You've got anglers, you've got conservationists, you've got the government and you've got companies that make their living off it. We've all got to work to together to make sure that the sport we all love is successful. Conservation is a central part of all that."

Conservation News & Initiatives

A Year of Successful Fundraisers

2014 was a year of very successful fundraisers for BTT. In addition to the Boca Grande, Naples and New York City fundraising events, we added the inaugural George Hommell Jr. Florida Keys Habitat Fundraiser in Islamorada and the Evening With a Legend event in Boston. Including this years 5th International Bonefish and Tarpon Trust Symposium in November, the events helped raise record funds for BTT.

Photo by Dan Dow

The proceeds from the fundraising events are hugely important in helping BTT reach our programmatic goals. We would like to thank everyone who organized, sponsored and attended these events for their generous support. Please visit www.btt.org for a list of 2015 events or to start an event in your city.

Costa's Project Permit

Through our tagging research, we believe that most permit tend to be homebodies, but there is evidence that some permit move greater distances. In April 2014 an angler reported a recaptured permit near Lake Worth, FL. It traveled over 65 miles north of the Special Permit Zone where it was originally tagged over two years prior, grew 2.25 inches and gained 2.5 lbs.

This discovery came on the heels of a BTT permit tagging trip where contributing scientist Dr. Zack Jud successfully placed the first ever satellite tags on two Florida Keys permit.

Every bit of data that we gather through Project Permit is vital to the future of the permit fishery. Although we have made much progress in the past five years, we still lack information on fishing effort, harvest, habitat use, migration patterns, age structure, and growth rates. Please report any tagged fish that you catch directly to BTT.

Photo by Dan Dow

Florida Keys Initiative

For the second year in a row, scientists, guides, and volunteers from Bonefish and Tarpon Trust searched for baby bonefish in the Florida Keys. We are happy to announce that despite finding no juveniles the prior year, this year we were successful in locating juvenile bonefish in one location of the Upper Keys.

If you find juvenile bonefish, please let us know the location and date (email: info@bonefishtarpontrust.org). Please do not collect the juvenile bonefish; a research permit is required.

FWC Agrees to Cuda Workshops

In the winter of 2014, representatives from Bonefish and Tarpon Trust, the Lower Keys Guides Association, Keys Keeper, The Florida Keys Fishing Guides Association, and the Snook and Gamefish Foundation attended the FWC Commissioner's meeting in Key Largo, FL to express their concern for the declining number of Great Barracuda in southern Florida.

The state of Florida has a bag limit of 100 pounds of barracuda or two fish per-day and both recreational and commercial fishing for barracuda is largely under regulated, which has led to overfishing concerns. The Commissioners agreed that the issue is worthy of future workshops in Monroe County to asses the public opinion on the local barracuda population.

FIU Launches Study of Florida Bay Bonefish

At the Fifth International Bonefish Tarpon Symposium held Nov. 7-8, 2014 in Dania Beach, Jennifer Rehage, associate professor at the Southeast Environmental Research Center at Florida International University, announced the launch of a comprehensive, three-year, BTT funded study to examine in fine detail what's going on with the Keys bonefish population, particularly in Florida Bay. Rehage said that when the study is completed, "we'll know what happened and how it happened to bonefish in the bay."

Photo by Dan Dow

BTT Launches Second Juvenile Tarpon Habitat Restoration Site

Scientists at Bonefish and Tarpon Trust broke ground this fall at their second Juvenile Tarpon Habitat Restoration site by setting up antenna arrays that will be used to track juvenile tarpon movements within a series of canals. "The first step is to see how the fish currently use the canal system," said JoEllen Wilson, BTT's Juvenile Tarpon Habitat Program Manager. "Then once the restoration is complete, we will continue to sample to see if the tarpon prefer one type of habitat over another." The habitat restoration is expected to start in the fall of 2015.

Photo by Dan Dow

BTT Awarded the AFS Conservation Achievement Award

This year, The American Fisheries Society presented Bonefish and Tarpon Trust with the prestigious Conservation Achievement Award for the Fisheries Management Section. This annual award recognizes an organization's outstanding contributions to fishery conservation or fishery science.

(above)
Photo by Pat Ford

The Bahamas Initiative

With BTT conservation efforts expanding throughout the Islands of the Bahamas, it became apparent that someone was needed to represent BTT in the Bahamas on a full time basis. In October 2014, BTT hired Bahamian native Justin Lewis as the Bahamas Initiative Coordinator. Justin is in charge of leading conservation efforts such as tagging and habitat restoration. He will also be charged with maintaining and forging new relationships with the many lodges and guides around the islands that depend on the health of the bonefish fishery for their livelihood.

Justin Lewis

The Devil's in the Details:

Studies of Fine Scale Behaviour Reveal Bonefish Foraging Habits, Swimming Speeds, and a Recovery Strategy for Anglers

JACOB BROWNSCOMBE, Fish Ecology and Conservation Physiology Lab, Carleton University, Ottawa, Canada
DR. ANDY DANYLCHUK, Department of Environmental Conservation, University of Massachusetts Amherst
DR. STEVEN COOKE, Fish Ecology and Conservation Physiology Lab, Carleton University, Ottawa, Canada

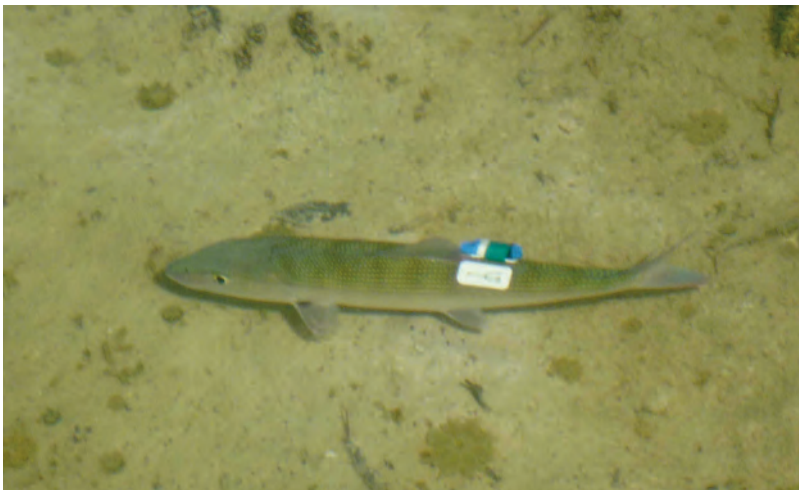
Bonefish Foraging Behaviour and Swimming Speeds

Broad-scale bonefish movements have been studied in regions of Florida, The Bahamas, and Puerto Rico using acoustic telemetry. This has helped us understand how bonefish use space across daily and seasonal scales, and has even aided us in identifying their spawning locations. While this is very useful information for bonefish conservation, many important questions about fine-scale bonefish behaviour remain unanswered. When and where do bonefish forage? How fast do they swim? While many anglers and guides have useful anecdotal insight into these questions, they have yet to be addressed in a scientific way. Our recent research has aimed to study these questions using accelerometer technology.

Our first step was calibration of our accelerometer tags to allow accurate measurement of bonefish swimming speeds (see the sidebar [on the next page] to learn how accelerometer tags work). This was achieved by placing tagged bonefish in a swim tunnel (basically a treadmill for fish) and studying them as they swam at a range of speeds. This allowed us to generate a mathematical equation capable of estimating bonefish swimming speeds from acceleration data. We then placed 5 accelerometer-tagged bonefish in a mangrove wetland in Eleuthera, Out Islands, The Bahamas, for a 5-day period and observed their behaviours, including swimming, resting, burst swimming, drifting, and foraging. This semi-natural environment allowed for behavioural observations to be conducted, as well as retrieval of the tags, which is necessary as the tags themselves store the information internally.

Bonefish likely spend more time foraging under the cover of darkness than we previously realized.

During this observation period, bonefish spent an average of 26% of their time actively swimming and 17% coasting, employing a swim and coast strategy. Bonefish were most active at dawn, followed by the daytime. However they were also quite active at night, which is when the most foraging behaviour was detected of any period within the studied daily cycle. We know from acoustic telemetry studies and visual observations that bonefish use tidal flats at night, and our findings suggest that bonefish likely spend more time foraging under the cover of darkness than we previously realized. Bonefish foraged an average of 11 times/hour, searching for prey on or within the substrate. While swimming, bonefish generally moved slowly, at a mean speed of 0.6 feet per second, but exhibited occasional burst swimming at speeds of up to 14 to 21 feet per second across individuals. This represents natural behaviour, as bonefish may reach even greater speeds when taking drag, hooked up on a fly rod.



[Bonefish] exhibited occasional burst swimming at speeds of up to 14 to 21 feet per second across individuals. This represents natural behaviour, so bonefish may reach even greater speeds when taking drag, hooked up on a fly rod.

Recovering Angled Bonefish

Because bonefish are such strong swimmers, they often have little energy left after being angled. Some bonefish habitats also have extremely high densities of their predators such as lemon sharks and great barracuda, which take advantage of exhausted bonefish as an easy meal. Research has found post-release predation rates of up to 40% in some regions. This is an important conservation issue for bonefish that is directly related to angling, so we set out to determine what behavioural mechanisms were

Research has found post-release predation rates of up to 40% in some regions…retaining bonefish for a short period in a recovery bag has strong potential to reduce post-release behavioural impairment and predation rates of angled bonefish in regions where predator burden and predation risk is high.

contributing to post-release predation in an attempt to unlock mitigation strategies. To accomplish this we conducted a study in a tidal creek in Eleuthera to compare the swimming capabilities and predation rates of bonefish immediately after their release compared to those retained in a 'recovery bag' for 15 minutes prior to release. To assess swimming capabilities we tagged bonefish with accelerometers and tracked them for 30 minutes post-release to visually monitor behaviour, survival, and remove the tags to retrieve the data. We found that bonefish were much more vigorous after being retained in recovery bags, and exhibited significantly improved swimming capabilities within the first 5 minutes post-release; this period is the most critical time for post-angling bonefish survival, as this is when most post-release predation typically occurs. Additionally, we found that bonefish retained for a short period also spent more time in shallower water, close to mangrove and rocky structures, while immediately released fish swam into the main creek channel more often, which is where one immediately released fish was attacked by a large great barracuda. Collectively these results suggest that retaining bonefish for a short period in a recovery bag has strong potential to reduce post-release behavioural impairment and predation rates of angled bonefish in regions where predator burden and predation risk is high.

The Take-Home Message

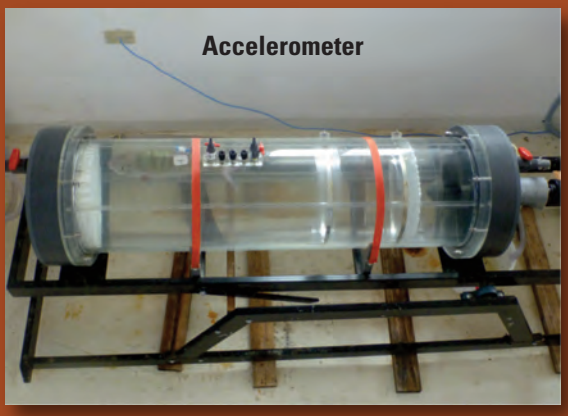
Bonefish populations are currently faced with numerous threats to their sustainability, sparking concerns about their conservations from anglers and scientists alike. We now have insight into the daily patterns of bonefish swimming and foraging behaviours, and perhaps more importantly, we have developed methods capable of measuring bonefish foraging in the wild to determine key feeding locations. These data could go a long way for understanding and protecting key bonefish habitats. Further, recovery bags appear to be a promising tool for anglers, allowing them to retain bonefish for a short period to improve post-release survival in situations where predation risk is high. While more research must be done to address these questions, with continued support from enthusiastic anglers and organizations like Bonefish and Tarpon Trust, we are opportunistic about the future of bonefish research and conservation.


Recovery bag

New Tech—

Accelerometers measure fish behaviour on a finer scale

Most of us carry an accelerometer with us nearly all the time. They're a component of all smartphones, used primarily to measure movement and changes in orientation to alter screen rotation. Because of this functionality, accelerometers are also very useful for studying fish behaviour. When placed on a fish as a compact tagging package, this technology provides extremely fine-scale (up to hundreds of samples per second) information about the fish's movement and body posture. Every tail beat and body turn is measured in acceleration forces, documenting each movement that the fish makes, which is useful for studying behaviours such as swimming, spawning, or feeding.


Accelerometer

Taking Shortcuts

How Some Bonefish Get Around Grand Bahama

KAREN J. MURCHIE, AARON D. SHULTZ
JEFFREY A. STEIN, STEVEN J. COOKE
JUSTIN LEWIS, JASON FRANKLIN
GREG VINCENT, EDWARD J. BROOKS
JULIE E. CLAUSSEN, DAVID P. PHILIPP

Adult bonefish on the move. Photo by Karen J. Murchie

Grand Bahama is the second most developed island in The Bahamas.

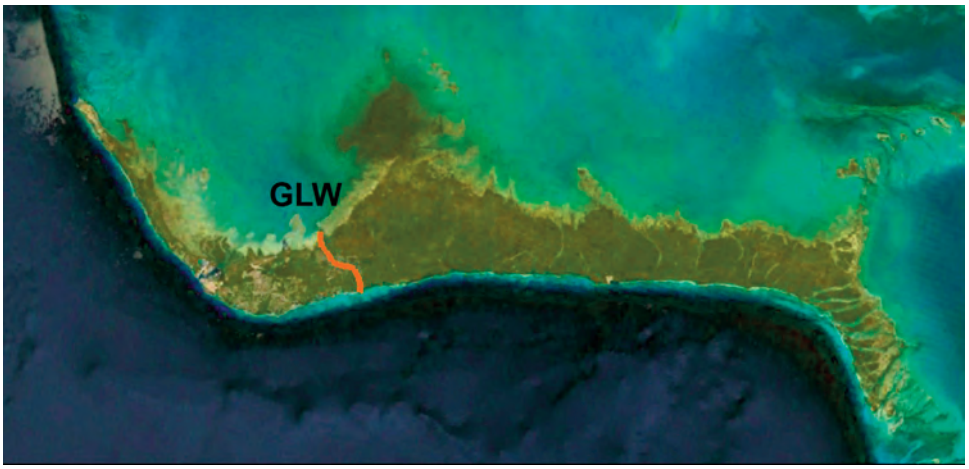
During the late 1950s and early 1970s, a couple of major changes to the island's geography were made. First, Hawksbill Creek, a natural system that connected the north and south sides of the island and served as a migration route for bonefish, was severed when a road was created and a shipping harbor was developed. Second, a man-made canal, the Grand Lucayan Waterway (GLW), was constructed to increase the amount of waterfront property for sale in the vicinity of Freeport and to establish a throughway between the shallow Little Bahama Bank on the north side of the island with the deep Northwest Providence Channel on the south side. Since these changes were made, no one has examined the contemporary movement corridors of adult bonefish around Grand Bahama.

By tagging 30 bonefish with acoustic transmitters and deploying 17 listening stations to detect our tagged fish as they swam around the island or through the GLW, we were able to determine bonefish movements during their spawning season between October 2013 and May 2014. With more than 26,000 detections, we found eight adult bonefish used the GLW to move from the north side of the island to the south side. These movements typically corresponded to one to four days either before or after new or full moon phases, which are known to produce stronger tides that can aid in larval dispersal during spawning. Not all bonefish used the man-made canal to go from the north to the south side of the island. Two bonefish went from the north side, around to the west end of Grand Bahama, with one fish continuing east of the GLW for a total distance of approximately 55 miles from its original tagging location. Additionally, two bonefish traveled from the north side of the island, all the way around to the east end of Grand Bahama, at a distance of approximately 50 miles from where they were tagged.

Findings from this study suggest that nearshore coastal areas are imperative to bonefish as migration routes during spawning season. Also, the GLW, which was not originally constructed as fish habitat, now needs to be managed as such.

The success of this project has been a result of multi-stakeholder collaboration. By partnering scientists from various tertiary institutions with Grand Bahama bonefish experts from H2O Bonefishing, we were able to maximize our limited resources and place listening stations in strategic locations. We are excited to expand our research on the movements of adult bonefish around Grand Bahama during the 2014-2015 spawning season and have added another collaborator to our project – the North Riding Point Club! This time we have tagged more than 50 bonefish and have almost doubled the number of listening stations to not only

get an even better understanding of their movements during spawning season, but also we hope to identify pre-spawning aggregations and even spawning locations by including lots of manual tracking. Knowledge that can help us more effectively manage and conserve bonefish populations is not only great for the multi-million dollar fishery, but also for the ecology of these nearshore systems.



Map of Grand Bahama with the location of the Grand Lucayan Waterway (GLW) highlighted.

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Anglers have come to Deep Water Cay since 1958 for its legendary flats fishing and to take their places alongside their fathers and grandfathers and some of the world's most famous anglers.

Recent record-setting catches, including a 14.6-pound bonefish and a 45-pound permit, bear witness to the Cay's meticulous conservation efforts. Reef and offshore angling take sportsmen to the grouper, snapper, mahi, wahoo, and tuna that provide fresh entrées nightly at the Lodge. Deep Water continues to emphasize the tradition of genuine hospitality and outdoor adventure. Recent multimillion-dollar upgrades have also instilled the property with a new sense of relaxed elegance. The guides are superb, the staff is incredibly friendly, and if you want the ultimate large bonefish and permit experience, this is it.

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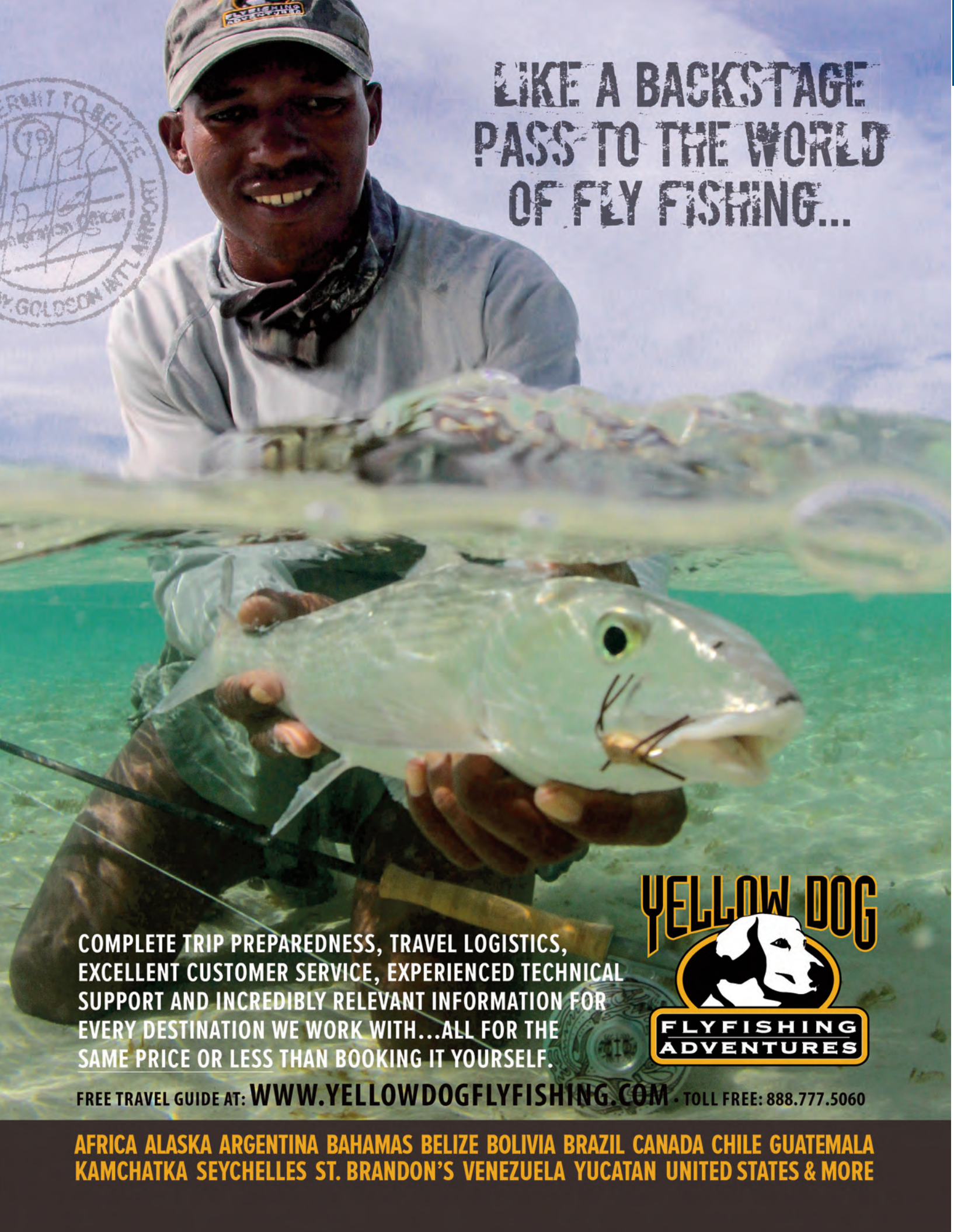
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Ken Wright

MIKE HODGE
is a freelance outdoor writer
who lives and fishes in Florida
Photos by Pat Ford

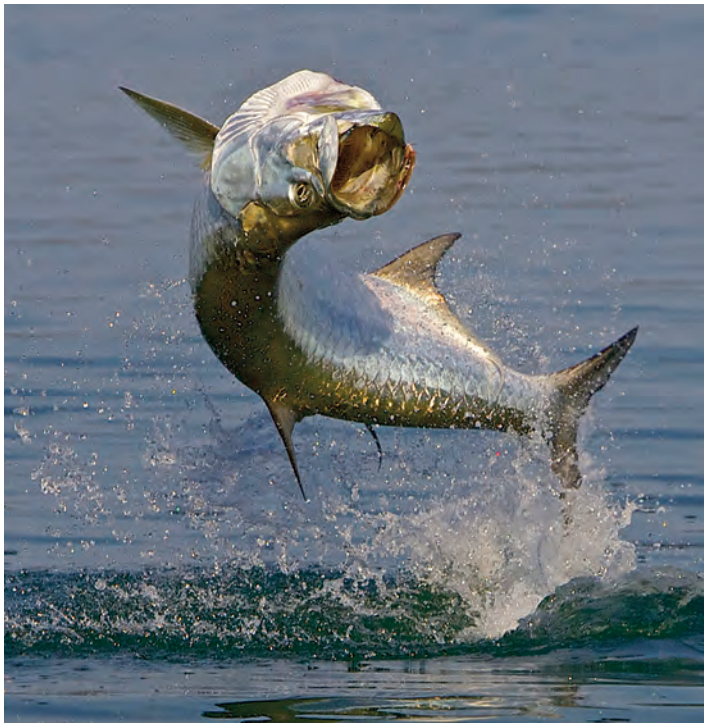
When Ken Wright looks back on his tenure as the Chairman of the Florida Fish and Wildlife Conservation Commission, his legacy is defined by a single species of fish and one rule.

Tarpon are now catch and release.

Both pieces of FWC regulation came during the final stretch of Wright's FWC tenure nearly two years ago.

"It was the most significant thing that I did on the Commission while I was there," Wright said. "If I had stayed another 10 years, I would not have done anything that would have been more meaningful to me than getting those two rules passed."

To recap, first the FWC Commission made tarpon catch and release only (except for a provision allowing tarpon to be kept for world records using a special harvest tag). This addressed concerns about some of the handling practices being used by anglers that increased the mortality of tarpon after release.



Second, the use of the boca grande jig for tarpon fishing was banned. This new rule, which went into effect in November of 2013, provided closure to an issue that has divided Boca Grande residents, conventional and fly anglers, tournament organizers and conservationists for years.

"It's meaningful in a couple different ways," said Wright, a BTT Board Member, who won the Flats Stewardship Award at the fifth BTT Symposium last fall. "For me it represented a challenge. (No jigging rules) had been attempted before. It was just the challenge to pick it back up. In spite of the limited number of tarpon I've managed to catch, I've always loved the whole notion of tarpon and tarpon fishing. I like the fish. I like the way you fish for them. I like everything about it."

"The first order of business, strategically, was to make tarpon catch and release. Once you make them catch and release, then it makes the second part of it in terms of gear restriction become that much easier."

The biggest obstacle in implementing the rule was selling conservation to a handful of fellow commissioners unfamiliar with tarpon and fishing etiquette.

"Listen I can't say enough about that commission, every one of them," Wright said. "Nevertheless, they were not tarpon fishermen; they were not tarpon anglers. Take someone, for instance, from North Florida who is into quail hunting and deer hunting, and then try to engage them passionately about an issue involving tarpon in a relatively small geographic area, that was a challenge. Yes, there's the limited number of people who fish for tarpon. I get that. It's not like red snapper. It is a small geographic area around Boca Grande Pass. But that is a special place for the aggregation of tarpon, how the tarpon work, where they go, the way they migrate. That was the challenge to get them engaged. They were engaged."

And history was made.

Costa's Project Permit Update and Moving *Forward*

DR. AARON J. ADAMS
is Director of Operations for Bonefish & Tarpon Trust

Photo by Pat Ford

We have come a long way since the first days of Project Permit. Thanks to this program permit have received improved protections in Florida. The Florida Keys is now a Special Permit Zone, where the spawning season is closed to recreational harvest, recreational harvest limits are now reasonable, and there is no commercial fishing is allowed.

One of the main goals of Project Permit is to determine whether the spatial scale of conservation is appropriate for management of the permit fishery at hand. For example, in Florida, is the Special Permit Zone appropriate for protecting the flats fishery in the Keys? Is the Sian Ka'an Biosphere Reserve in Mexico large enough to protect its famous permit population? Where should habitat conservation efforts be targeted in Belize?

Since 2010 BTT has been working with fishing guides and anglers in a tag-recapture approach to estimate the movement of permit. In Florida more than 1,000 permit have been tagged, but only 16 have been reported recaptured. The recaptures show two modes of movement: first, most (13) recaptures occurred within the same region as tagging. Interestingly a second observation found that three permit were recaptured more than 20 miles from the tagging location, suggesting permit do indeed undergo long-distance movements. Were these movements associated with spawning or just normal movements? The jury is still out on whether the Special Permit Zone is large enough to protect the Keys flats fishery.

In Mexico, more than 300 permit have been tagged and six have been recaptured, all close to the tagging location. But the studied fishery occurs in a relatively small portion of Ascension Bay, so the question remains—are permit also traveling longer distances and just not being caught? Work is ongoing to figure this out by educating fishermen who fish outside of the protected zone to report any tagged permit they recapture.

Dr. Zack Jud prepares a permit satellite tag. Photo by Dan Dow.

More than 150 permit have been tagged in Belize, with only one recapture. Unfortunately, the angler who caught the tagged fish was so excited about catching a permit that he forgot to look at and record the tag number!

Slowly but surely we are obtaining data on movement patterns of permit, which will be used to revise management if necessary. As with recreational fishing for permit, it will take long-term persistence to unveil the findings of the tagging program. Rest assured, it seems that permit guides and anglers are up to the task. If you are not yet participating in Project Permit and want to take part, please contact us for a tagging kit. If you are traveling to a fishing lodge to fish for permit, ask them if they are part of the tagging program. If so, tag away! If they're not involved already, please let us know and we will contact them to get them involved.

We are now experimenting with small satellite tags for permit. Thus far there has been limited success. In the two cases to date, the tags unfortunately came off the permit after only a few weeks. It appears that the tags were hit by barracuda (based on the teeth marks on the tags), which may indicate the possibly that the barracuda thought the tag trailing the fish was food. The tags provided information on permit depth versus time of day and tide. We have two more tags to test before we determine if satellite tags are a valid avenue of research for Project Permit.

Juvenile Tarpon Habitat Initiative

JOELLEN WILSON
is Manager, Juvenile Tarpon Habitat Program, Bonefish & Tarpon Trust

DR. AARON J. ADAMS
is Director of Operations for Bonefish & Tarpon Trust

Photos by Dan Dow

Here are a few facts about tarpon with which we are already familiar.

1 Tarpon are a prized saltwater fish that can live in excess of 80 years, grow to more than 250 pounds and are sought after by recreational anglers throughout the tarpon's geographic range.

2 The recreational fishery is economically important. For example: The annual economic impact of the recreational tarpon fishery exceeds $110 million in Charlotte Harbor and $70 million in St. Lucie estuary; tarpon are a part of the $465 million/year flats fishery in the Florida Keys and the $1 billion fishery in the Everglades.

3 Tarpon use a variety of habitats, including coastal, estuarine, offshore, rivers and wetlands.

Here's something that many don't know, or just don't think about when they are out chasing big tarpon: As juveniles, they depend upon backwater wetlands and swamps. Without these backwater habitats, we would have few juveniles surviving and becoming the big fish that make anglers weak in the knees. In other words, places where most anglers don't fish are essential to the fishery.

JoEllen Wilson scans for a tag inside of a juvenile tarpon.

Unfortunately, in many areas these backwater habitats have been lost or have become degraded. In fact, the loss and degradation of juvenile habitats is a major reason that a recent International Union for the Conservation of Nature scientific assessment classified the tarpon population as "vulnerable." This is why Bonefish & Tarpon Trust launched the Juvenile Tarpon Habitat Program a few years ago. We're pleased to report that the program is gaining steam.

Unfortunately, mangroves are under threat worldwide: globally, approximately 35 percent of mangroves have been lost and continue to be lost at a rate of 2 percent a year; in Florida, approximately 50 percent of mangroves have already been lost, and degradation of these habitats continues. Since the amount of available habitat is one of the most important factors in determining the overall population size for most fish species, the loss of these critical habitats has direct and immediate effects on tarpon and the fisheries they support.

Because tarpon's juvenile life stage depends upon coastal wetland habitats that continue to be lost, and tarpon are so long-lived, the loss of these habitats can have significant long-term effects on the tarpon populations. For example, impacts on long-lived and late maturing species like tarpon (tarpon are sexually mature at 8 – 12 years of age and can live to 80 years) might not be visible in an adult population until a decade after the habitat is lost. The species have similarly long population recovery times. This is because it takes so long for tarpon to become mature that even when lost juvenile habitats are restored and more juveniles survive to adulthood, there is a delay of 10 or more years before these new fish are able to reproduce and add to the population. Therefore, juvenile tarpon habitat restoration is truly an investment in the future of the fishery with long-term implications.

You'll remember from past journals that BTT's first juvenile tarpon project was a collaboration in Charlotte Harbor, Fla., with Lemon Bay Conservancy, a conservation land trust based in Boca Grande, Fla. We recently completed two years of juvenile tarpon sampling—including tag, recapture and measuring growth—at the LBC Wildflower site. These two years of data will be used as a baseline for comparison once the Wildflower habitat is restored to its natural state—a mixture of tidal creeks, ponds and wetlands.

Our preliminary data show that although there are many juvenile tarpon in what are now overgrown golf course ponds at Wildflower, their growth rates are extremely slow. Is this because there are so many juvenile tarpon competing for what little food is available? Will their growth rates be better once the habitat is restored? Are there so few juvenile habitats left that

Right. Throwing a cast net is one of the techniques used to catch the juvenile tarpon. Photo by Dan Dow.

the few remaining habitats are overcrowded? We will hopefully know the answers to these questions soon.

The Wildflower project, and work we have been doing elsewhere, led to a new collaboration. This time, we are collaborating with Charlotte Harbor National Estuary Program, Southwest Florida Water Management District and Florida Department of Environmental Protection on a project, Coral Creek, also in Charlotte Harbor. An ongoing large-scale habitat restoration project was revised to accommodate the Coral Creek project. For this project, six remnant canals from a long-abandoned development are being sculpted to act as juvenile tarpon habitat. We are testing three different designs to see which works best. The results of this 3-year project will help guide restoration—as we learn what habitat characteristics are best for juvenile tarpon, we will be able to improve the success of future habitat restoration.

The team discusses antenna placement at the Coral Creek project. Photo by Dan Dow.

Building on the momentum from these two projects in Charlotte Harbor, we are now looking for more habitat opportunities. Most recently, we began working with guides and anglers in South Carolina. After receiving multiple reports of anglers catching juvenile tarpon in wetland impoundments in the Lowcountry, we began working with South Carolina collaborators to create a proposal to study these juveniles. Although we know that juveniles are found in these wetland impoundments, how widespread are they? Are they able to survive the winter? If we modify how the wetland impoundments are managed, will this increase juvenile tarpon survival? Do these wetland impoundments contribute tarpon to the fishery for adults? Given the large geographic extent of these wetland impoundments along the South Carolina coast, the answers to these questions are important.

As we learn more about the specific habitat characteristics that are best for juvenile tarpon, we will be able to better target habitats for protection and restoration. And we'll be able to continue expanding the Juvenile Tarpon Habitat Program (in fact, we have more projects that we hope to begin soon). This is certainly not for those looking for instant gratification, but it's essential for the future of the fishery.

Because tarpon's juvenile life stage depends upon coastal wetland habitats that continue to be lost, and tarpon are so long-lived, the loss of these habitats can have significant long-term effects on the tarpon populations.

baby bone blitz

It was mid June and I was finally back in my happy place. I was standing on the bow of a skiff, gliding along a flat in the Florida Keys, in search of bonefish. The problem was, I didn't have a fly rod in my hand. In fact, there wasn't even a rod or reel on the boat. That may seem strange, but the mission of this particular trip wasn't to stalk and catch one of the fabled monster grey ghosts of the Keys. On this day we were in search of baby bonefish less than 5" long. Instead of rods and reels, we were loaded up with seine nets and spent most of our time outside of the boat hauling the nets through the shallows for Bonefish and Tarpon Trust's 2014 Baby Bonefish Blitz. The mission of the Blitz is simple, the work can be back breaking, but the data collected is incredibly important to the future of our Florida Keys fishery.

This is the second consecutive year that BTT scientists, guides, and volunteers have scoured the flats of the Keys in search of baby bonefish, juvenile Albula vulpes. It's like looking for a needle in a haystack. Only the haystack is over 100 miles wide and the needle can swim.

We were specifically looking for the A. vulpes species of bonefish. Of the three bonefish species known to inhabit Florida and the Caribbean, A. vulpes supports over 99% of the recreational bonefish fishery. Previous sampling efforts produced juvenile bonefish in the Keys, but the majority of them were identified as Albula garcia, one of the other two species that is only occasionally on the flats as adults.

More recently, BTT has funded research in the Bahamas to identify the preferred nursery habitats of A. vulpes. We have learned that they like well-protected, sandy or silty beaches, often located within relatively deep basins that hold water throughout the tidal cycle. They will also disperse themselves among schools of similarly sized mojarra (a type of small bait fish) as a means of camouflage. Sneaky sneaky.

We are now using that Bahamas model and applying the data in the Florida Keys to identify similar A. vulpes nursery habitats. Although the first year of the Blitz in 2013 was more of a recon mission, the sampling that did occur did not produce a single juvenile fish. Their absence obviously raised some concerns and we were eager to see if sampling this year would yield a more positive result. Sure enough, about half way through our first day of sampling, we found a few juvenile bonefish in the northeast corner of Florida Bay. The fish were mixed in with a school of mojarra on the sandy shore of a well-protected basin. We are still waiting for genetic confirmation of their species, but all of these signs point towards A. vulpes.

In places where we did not find any juvenile bonefish, we did find some sites that exhibited ideal habitat. BTT contributing scientist Chris Haak said, "It's worth noting that, even in the Bahamas, in the most ideal habitats, we don't generally catch large numbers of juveniles in a given seine haul. Because they are so dispersed among the mojarra, you generally need to collect a minimum number of mojarra in a haul (roughly 100 or so) before you have much of a chance of encountering a baby bone." He added, "One of the challenges in the Keys has been finding good numbers of the right species of mojarra."

BTT is desperately trying to positively identify these juvenile bonefish nurseries in the Keys. Juvenile fish tend to have very strict habitat requirements, making them extremely sensitive to environmental degradation. Since the nurseries occur in the shallow, coastal areas that are most often impacted by human activities, it is critical that we protect all of the prime locations that we still have left.

DAN DOW
is Bonefish and Tarpon Trust's PR and Communications Manager

Photos by Dan Dow

Photo by Chris Haak

One of the more concerning issues surrounding the loss of nursery habitat is that the impacts may not be felt for a long time. In the case of bonefish, a fish that often has a life span exceeding 20 years, this is especially true. As a fish with a longer life span grows older, its growth rate tends to slow down. So in a school of bonefish you can have many similar sized fish, but their age range will vary. If we can't tell the young stud bonefish from the old-timer bonefish, and there truly is an issue with our nursery habitats, the effect won't be seen until the older fish start dying off. With no younger fish to replace them, this transition could literally take years to notice and by then the damage to the $465 million dollar per year Keys flats fishery may be irreversible.

Through the Florida Keys Initiative, Bonefish and Tarpon Trust is doing it's best to bring the ailing Keys bonefish population back to its former glory. As our knowledge of these fish grows larger, our conservation efforts will continue to ramp up. BTT relies on donations from anglers like you and other anglers that truly care about the health and well being of the fishery to keep those efforts rolling. For more information on the Florida Keys Initiative, or to become a member of BTT, please visit www.btt.org.

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Matt Connolly

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Ask Matt Connolly to name his favorite fish, and options abound. Tarpon, bonefish, and permit in the Keys. Or striped bass in Maine. Take your pick. But ask the President of BTT about his most memorable fishing trip, and a history lesson will be delivered. It's not every day that you get to fish with a former U.S. President.

Connolly and Bass Pro founder Johnny Morris made headlines in June when they visited George H.W. Bush at his summer home in Maine. The purpose of the trip, in part, was to celebrate the 41st president's 90th birthday.

Their gift is a bit unusual. After navigating through a maze of federal, state and local bureaucracy, they named a stretch of water for their close friend. Little Basin flat, off Islamorada, is now known as Two George flat, a tribute to Bush and his Keys guide, the late George Hommell, Jr. "When the two went out on the water, what they did stayed on the water," Connolly said. "They were fishing buddies."

Hommell passed away in August of 2013. But Bush is still jumping on planes and taking guests fishing near Kennebunkport. "We went striped bass fishing," Connolly said. "We rode around Walker's Point. The tide was not right. Time of day wasn't right. The striped bass, not surprisingly, did not cooperate. There is a lot more to fishing than catching fish; the generosity of Johnny Morris and the grace and warm hospitality of the President and the First Lady made this the most memorable fishing experience of my life."

Connolly, who has been involved with BTT for more than a half dozen years, knew Bush from his tenure as CEO of Ducks Unlimited. Bush's first presidential speaking engagements came at the 1989 DU International Waterfowl Symposium. Bush was there to talk wetlands and wildlife, but couldn't help but chat up Connolly about a recent fishing trip. "When he came, he and the Secret Service went through the kitchen of the Marriott Hotel," Connolly recalled. "He and I were in the corner and he had just caught a 13-and-a-half pound bonefish in the Keys, which is a very big bonefish. I congratulated him. Like any fisherman, he wanted to tell me about it. We stood in the corner for two minutes and everyone wondered, 'What the hell are you talking about with the President?'."

Connolly served on a federal wetlands council under Bill Clinton and the elder Bush, who created 56 wildlife refuges and restored 3 million acres of wetlands during his time in the White House.

"He accumulated more places for wildlife refuge than any President, including Theodore Roosevelt and he did it quietly. He did it humbly. He's not a braggadocio," Connolly said.

Before joining BTT, Connolly served as CEO of Ducks Unlimited for 12 years. During that stint he helped raise $1 billion as it's international membership climbed to more than 1 million.

BTT, which is still in its formative stages, is much smaller, but there are similarities between the two conservation groups.

"They're both membership organizations that draw upon citizen conservationist with a vested interest in a resource," Connolly said. "There is, I believe, a parallel there in that we have to know a great deal about the environment where the species of our concern live in order to make sure that the populations sustain themselves for generations to come. BTT has been hard at work learning and acquiring the knowledge necessary to propose management schemes that assure science based management."

Ducks are harvested. Bonefish, tarpon and permit are not.

"We only harvest a memory of the moment," Connolly said. "One of the wonders of fishing is you can briefly embrace it, release it, and free it back into the wild. As the Wulffs' always said, pass it along to someone else."

DU has the benefit of being able to target and motivate a united continental membership. With BTT, such a task is more complex. The key, perhaps, is to identify and assess its potential stakeholders, which continue to grow.

"The other thing is no one knows how large our audience is," Connolly said. "No one licenses flats fishermen. They license turkey hunters, deer hunters and duck hunters. You have their names and addresses and you know everything demographically. We have to do that from scratch. We have to know how large our base is and how to get them out and get them to give of their time, talents and treasure. Unlike the ducks, BTT is the only international steward of the flats resource."

Reading the Flats

DR. AARON J. ADAMS
is Director of Operations for Bonefish & Tarpon Trust

Photo by Dr. Aaron J. Adams

One of the things that sets apart those who catch more fish than others is their ability to interpret the habitats where they are fishing. Where is the best place to be on a low tide, high tide, rising tide, falling tide? As any flats angler knows, being in the right place at the right time is a huge part of the challenge to catching fish on the flats. Even the best caster will go fishless if there are no fish.

The old saying is that a picture is worth a thousand words. But in this case, it's all about getting shots at bonefish. We can tell a lot about tides and how bonefish are likely to use this habitat from the photo at the top of this page.

First, look at the mangroves in the background. There is considerable space between the lowest mangrove leaves and the water. Much of the prop-roots are exposed. This means that it is near low tide. If the tide is still falling, it is doubtful that bonefish will be on the flat, but instead they will be off the deeper edge of the flat. If the tide is rising, this is the time and place to look for bonefish to push up onto the flat with the tide. If you look closely, you can see wakes from bonefish near the mangroves in the left-center portion of the photo. With wakes pushing onto the flat, we have an early rising tide, so we are in the right place to intercept incoming bonefish.

By looking at the bottom we can also get an idea of whether the flat will be fishable during all stages of the tide. The bottom is sparse seagrass, dominated by open sand. This likely means that this flat is exposed to air at most low tides – exposed frequently enough that the sparse seagrass survives only in the depressions that are scattered across the flat. What does this mean for fishing this flat? At low tide, look for bonefish to be in deeper water off the flat, or perhaps cruising the edges. And then look for these fish to move onto the flat with a rising tide, and to move off the flat as the tide drops. So a good strategy would be to stake out near the edge on either side of low tide, and then to stalk fish closer to the shoreline near high tide.

If, in contrast, the flat had high seagrass coverage, this would mean that it remains covered by water most of the time. And though some bonefish would likely move onto and off of the flat with the tides, such a flat would likely hold bonefish throughout the tidal cycle.

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