The FFI Learning Center is a primary source of educational and instructional materials, to meet the needs and interests of the fly fishing community in the areas of FLY FISHING SKILLS, FLY CASTING, FLY TYING, and CONSERVATION. The Learning Center is a combination of annual in-person workshop instruction and downloadable instructional materials found on the FFI website.
» www.flyfishersinternational.org

» Nonprofit, national governing body

» Only organization to focus on the fly angler:
  “All Fish, All Water”

» Founded 1965 in Eugene, Oregon

» Fly Fishing Skills, Casting, Fly Tying, Conservation

» “Educating, Conserving & Restoring through Fly Fishing”

CONSERVATION / EDUCATION / COMMUNITY
CONSERVATION AND THE FLY FISHER

Fly Fishing Learning Center Module prepared for the 2018 Fly Fishers International Fly Fishing Fair

Developed by Brad Eaton, Upper Midwest Council Conservation VP

and

David W. Peterson

FFI Board Board of Directors, FFI Conservation Chair and Great Lakes Council VP for Conservation
» Educational Resources for New and Experienced Fly Fishers

» Web Based Information Center- videos, curricula, brochures, podcasts

» Four Focus Areas-Fly Casting, Conservation, Fly Tying and Fly Fishing

» Roll Out at 2018 Fair
FIRST THING’S FIRST

INTRODUCTIONS

» Who are you? Where are you from?
» Where do you fish and what do you fish for?
» What do you want out of this?
» Beginner, intermediate, experienced?
WORKSHOP OVERVIEW

“PRACTICE PERSONAL CONSERVATION”—CONSERVATION PRINCIPLES IN YOUR OWN FISHING

CONSERVATION OF FISH
- Numbers of Fish Species
- Threats to Freshwater Fish
- Threats to Saltwater Fish
- Mitigating Against Those Threats

PUBLIC LANDS AND WATER

CONSERVATION OF MIGRATORY FISHES

CONSERVATION LAWS

FFI’S ROLE IN CONSERVATION
If presentation includes the “Practice Personal Conservation” slides, they are inserted here.
WHO’S COUNTING?
(Darwall and Freyhoff, 2016)

In this section, we will cover:

» Numbers of Freshwater Fish
» Major Sources and Types of Threats to Freshwater Species
» What needs to be done?
HOW MANY FISH SPECIES?

» 15,750 Freshwater World Wide

» Approximately 20,000 Marine Species

» 1,200 Freshwater Species in North America
A LITTLE MORE ABOUT THE SPECIES IN NORTH AMERICA

» 2/3 of species east of Continental Divide
» Western United States have lower species richness
  » Higher rate of species unique to specific locations (endemism)
  » Higher numbers of extinct species
> Rivers, lakes, and wetlands are among the most threatened ecosystems on the planet
> Pressured by growing human population and socio economic development
> Strain on the ecosystem is correlated with correspondingly high levels of threat to freshwater fish biodiversity
HOW MANY FRESHWATER FISH ARE THREATENED?

» One study of 7,300 species found 31% treated with extinction (IUCN, 2013)

» 3% already extinct globally (Burkhead, 2012)

» Exact numbers are very hard to calculate so these are educated estimates
CAUSES OF THREATS — FRESHWATER

» Pollution, pesticides, sediment loads
» Competition with humans for the use of water
» Harvest pressures (changes by region)
» Habitat degradation and altered flow regimes
» Connectivity of freshwater systems that allows for invasive and widespread dispersal of pollutants
» Most streams are affected by multiple stressors making matters even more complicated (Matthaei and Lange, 2016)
MOST SIGNIFICANT FRESHWATER THREATS CAUSED BY HUMANS (ANTHROPOGENIC)

Adapted from Malmqvist and Rundel (2002)

» Ecosystem Destruction

» Urban and agricultural expansion; water removal results in ecosystem loss
MOST SIGNIFICANT FRESHWATER THREATS CAUSED BY HUMANS, CONTINUED

» Habitat Alteration
  » Hydrology: dams, channelization, deforestation, etc. results in loss of natural flows, upstream/ downstream connection
  » Siltation: deforestation, land use issues
  » Altered riparian corridors: temperature changes, loss of woody debris
Most Significant Freshwater Threats
Caused by Humans, Continued

- Pollution and water chemistry
  - Acidification: caused by industrial emissions, reducing pH and creating toxic effects
  - Nutrient addition: agricultural and urban discharge, increases nitrogen and phosphorus
  - Organic pollution: waste increasing suspended solids and reducing oxygen
  - Toxins: agricultural, urban, and industrial causing physiological and toxic effects
Point Source Pollution: any single identifiable source from which pollutants are discharged, such as a pipe, ditch, or smokestack

Non-Point Source Pollution: results from runoff. Rain or melted snow moves over and through the ground and absorbs pollutants
NUTRIENT POLLUTION

» One of the greatest challenges to water quality (U.S. EPA)

» Much nutrient pollution comes from poorly managed agricultural land

» While nutrients themselves are toxic, nutrient pollution leads to algae blooms which harm fish and wildlife
MOST SIGNIFICANT FRESHWATER THREATS CAUSED BY HUMANS, CONTINUED

» Species removal and addition of other species

» Fishing, aquaculture, ornamental, intercontinental transport bringing invasive species which results in completion, predation, altered trophic dynamics
WHAT CAN BE DONE TO MITIGATE FRESHWATER FISH THREATS?

» Rehabilitation and Riparian Restoration—Regain Historical Ecological Status
  » Restore natural flow regimes
  » Restore riparian vegetation
  » Reestablish high water quality
  » Recent research suggests it is more effective to restore upstream reaches before restoring downstream reaches
RIPARIAN MANAGEMENT ISSUES

Figure-Linkages between the riparian zone and streams—credit to Wipfli and Richardson 2016, modified from original drawing by Leinberger in Closs, et. al. 2016
WHAT CAN BE DONE TO MITIGATE FRESHWATER FISH THREATS? CONTINUED

» Ecosystem-based fisheries management to improve sustainability
  » Avoid degrading ecosystems
  » Minimize risk to natural species
  » Understand likely consequences of human actions
What Can Be Done to Mitigate Freshwater Fish Threats? Continued

» Pollution
  » Control point source and non-point source pollution (Clean Water Act)
  » Reduce emissions
  » Control toxins and runoff
What Can Be Done to Mitigate Freshwater Fish Threats? Continued

- Destruction of ecosystems
  - Zoning restrictions
  - Conservation easements
  - Wetlands preservation
  - Other methods of conserving ecosystems
WHAT CAN BE DONE TO MITIGATE FRESHWATER FISH THREATS? CONTINUED

» Management strategies for invasives
  » Prevention and containment
  » Control and eradication
  » Restoration of indigenous species
  » Do non-indigenous species have any conservation value?
  » When does an non-native become native (e.g. Michigan Brown trout)?
THE GREAT LAKES - A CASE STUDY

SUSTAINING HEALTHY FRESHWATER ECOSYSTEMS
(Adapted from Sustaining Healthy Freshwater Ecosystems, 2003 by Jill S. Baron, N. LeRoy Poff, Paul L. Angermeier, Clifford N. Dahm, Peter H. Gleick, Nelson G. Hairston, Jr., Robert B. Jackson, Carol A. Johnston, Brian D. Richter, Alan D. Steinman)

» **Hold 20 trillion cubic meters of fresh water**, approximately 18 percent of the planet’s fresh water supply. Provide drinking water for 40 million people and supply 210 million cubic meters of water per day for municipal, agricultural, and industrial use.

» **Poor water quality** caused by excessive inputs of phosphorus and nitrogen; some basins also contain high concentrations of toxic chemicals; habitat destruction has been significant.

» **Native fisheries have been greatly altered** or intentionally replaced; invasive species have altered native food webs and water quality.
Water quality has improved dramatically from the eutrophic conditions that prevailed prior to the 1980s through greater regulation of point-source pollution.

However, water quality has not been restored to “natural condition.” Phosphorus enrichment increased the growth of diatoms and depleted lake silica concentrations (silica is a necessary nutrient for diatoms and sinks to the lake bottom when diatoms die).

Eutrophication may actually be masked by the filtering activity of zebra mussels.

Nonpoint source pollutants, including fertilizers, pesticides, sediment, and bacteria, still significantly impair Great Lakes.
Toxic Chemicals. Sediments store contaminants from industrial and agricultural runoff, as well as mercury and PCBs. These contaminants accumulate in fish and wildlife.

Habitat Destruction. Habitat loss throughout the basin. Urban sprawl replaces natural areas. Coastal wetlands are declining; hardened shorelines (reinforced by sheet piling or rip rap) appear to be increasing, thus isolating wetlands from lakes, destroying habitat, and altering natural sediment movements.

Climate Change in the Great Lakes region is profound. Some models suggest conditions that will lead to lower lake levels. Current climate models suggest more extreme swings in climate, and unusually wet years may lead to periodic flooding. The 35 million people in the Great Lakes Basin are unprepared for large changes in lake level in either direction.
Invasive Species have modified habitats, reduced native biodiversity, and altered food webs.

An estimated 162 exotic species now reside in the Great Lakes, including introduced sportfish.

Although the zebra mussel and sea lamprey have received the most attention, many other less apparent species profoundly affect the ecosystem, including quagga mussels and several others.

Lamprey control costs $10 million annually, and zebra mussel control has totaled some $4 billion as of 2001.
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The Great Lakes - A Case Study

- Great Lakes fail on most accounts as an example of freshwater integrity.
- Shoreline hardening affects connectivity of the lakes with their wetlands;
- Chemical and nutrient conditions represent a permanent change from natural conditions;
- Plant and animal presence has been highly modified by human intervention.
- Constant effort and expense are now required to maintain water quality, mitigate toxic inputs, control harmful non-native species, and restock valued recreational fisheries with exotic game fish that do not naturally reproduce in the lakes.
- Perhaps the Great Lakes can never be “restored” to the point where they are functionally self-sustaining, and therein lies a hard lesson.
» Do you have examples of species extinction or near extinction caused by pollution, habitat loss or overexploitation?
» How many native fish species occur in your state/region? Any threatened?
» Suggest a strategy to save on endangered species in your state/region.
Overfishing and Bycatch

From commercial fishing, recreational fishing, illegal unregulated or unreported fishing, and ghost fishing

Most damaging threat on a global scale

Benthic ecosystems of large parts of the ocean have been destroyed

In many areas, the weight of fish available to be harvested is less than one tenth of that available before industrial fishing
THREATS TO SALTFWATER FISH

» Climate change
  » Changes to ocean temperatures, acidity, water movement patterns largely caused by higher atmospheric carbon dioxide, and impacts from damage to the ozone layer

» Other impacts
  » Coral bleaching, effects on organisms using calcium carbonate body structures
  » Reduction in ocean overturning circulation risking changes in deep ocean oxygen content
THREATS TO SALTWATER FISH

» Habitat damage

» Largely caused by fishing gear, especially bottom trawling

» Also includes the effects of coastal development: destruction of coral reefs, mangroves, natural freshwater flows (and passage), coastal wetlands and sometimes entire estuaries – which support coastal marine ecosystems.

(From Neville, 2008)
THREATS TO SALTWATER FISH

» Ecosystem alterations
  » Caused by the introduction of alien organisms, especially those transported by vessel ballast water and hull fouling
THREATS TO SALTNWATER FISH

» Pollution (in-sea and land-based, diffuse and point source)

» Includes nutrients, sediments, plastic litter, noise, hazardous and radioactive substances; discarded fishing gear, microbial pollution, and trace chemicals such as carcinogens, endocrine-disruptors
THREE CORE CONCEPTS
(Neville, 2008)

» Ecosystem-based fishery management (EBM)

» The precautionary principle (PP) and the closely related precautionary approach (PA): “where possibility of serious harm exists, lack of scientific certainty should not preclude cautious action to prevent such harm”

» Strategic development of networks of marine protected areas (MPAs)
MITIGATING SALTWATER THREATS

» Overfishing and Bycatch
  » Enact quotas, limit gear, no-take areas
  » International fishing agreements
  » Surveillance and compliance programs

» Climate Change
  » International agreements focused on greenhouse gases
  » Incentives, prohibitions and market based programs aimed at reducing gases
MITIGATING SALTWATER THREATS

» Habitat Damage
  » Limits on gear, fishing areas, etc.
  » Fixed mooring systems in coral areas
  » Zoning programs that minimize loss of coastal habitat
  » Special protections for high value estuaries, (e.g. Now or Neverglades)

» Alien and Invasive Species
  » Controls on ballast water
  » Prohibitions on imports of aquaculture stocks
  » Infestation monitoring and removal programs
MITIGATING SALWATER THREATS

» Pollution
  » Controls on fixed point sources
  » Controls on specific pollutants
  » Programs that limit passage of nutrients and other pollutants to marine environments
  » Surveillance and compliance programs
» What are the most effective ways to conserve marine fisheries?

» Are you aware of effective management practices that have made a difference?

» Should some fisheries simply be closed?
» Public lands are threatened by transfer of budgetary responsibility or outright sale

» Habitats collectively reside as public lands and resources, managed by state or federal agencies or environmental law on public behalf; others protected as conservation easements

» Must be protected for recreational interests

» Any proposal to change or transfer ownership or management responsibility should be publicly reviewed and be subject to Environment Impact Statements (FFI, 2016)
Migratory Fish: defined as fish that display “synchronized movement of a substantial population between two distinct habitats”... “across generations” (McIntyre, et. al. 2016)

Anadromous vs. Catadromous

Degradation of habitat has made reliance on multiple habitats a detriment for many migratory fish
CONSERVATION OF MIGRATORY FISHES

» "Triple Jeopardy:" Dependence on multiple habitats and their intersections
  » Threats in either of two critical habitats can lead to extinction
  » Threats in interconnecting waters can lead to problems
  » Changes in any one of these create survival issues
Examples of Threats

- Habitat destruction in either critical habitat (e.g. loss of saltwater feeding grounds or siltation of spawning gravel)
- Blockage of interconnecting waters (e.g. dams)
  - Dams and culverts can affect fish moving in either direction; up or downstream
CONSERVATION OF MIGRATORY FISHES

» Dams: managing the old, new and planned
  » In US, where many dams were built in mid-twentieth century there is an increasing trend to remove them as they age
  » In contrast, many developing countries are installing new dams and view them as essential to economic development
  » Effective conservation practices will be driven by “adaptive management” using lessons from previous projects
  » Dams containing invasive and pollutants may not be candidates for removal
Examples of important federal laws

- National Environmental Policy Act (NEPA): Requires federal agencies to consider the environment when making decisions about federal land (mining, etc.) and requires Environmental Impact Statements
- Clean Water Act: makes it illegal to put pollutants into rivers, lakes and streams without a permit and contains provisions pertaining to oil and hazardous substance spills; protects wetlands
CONSERVATION LAWS AND THE FLY FISHER

» Examples of Important Federal Conservation Laws
  » Endangered Species Act (1973): protects endangered species against extinction and protects them against development
  » State Laws: states have adopted similar statutes addressing pollutions and conservation issues
CONSERVATION LAWS IN THE AREAS YOU FISH

» Fishing regulations in the states you fish

» What agencies, laws regulations affect fish conservation where you fish?

» It’s a Tangled Web!

» Example from Michigan: Fisheries Division of DNR, Department of Environmental Quality, Dept. of Agriculture, Corps of Engineers, Natural Resources Commission, and a few others
EPA’s recent rollback of the 2015 Clean Water Rules would remove many requirements effecting industry and agriculture.

Your position likely depends on your interests.

Who is “in charge” makes big difference.

Make your voice known!
» Conservation Grants
  » Generally 10 grants are provided each year
  » $1,500 per grant, frequently matched by $1,500 from sponsoring council
» Conservation grant examples:
  » Florida Council – Peacock Bass Research
  » Western Rocky Mountain Council, USFS, Bazinet-Mill Creek Wetlands Acquisition, Upper Yellowstone River Basinx
  » Great Lakes Council, Anglers of AuSable-Grayling Fish Farm Litigation
  » North East Council, Margaree Salmon Association-Lake O’Law Brook Salmonid Enhancement Project $1500
  » Northern California Council, Putah Creek Trout- Putah Creek Wild Trout Restoration Project,
    Southwest Council, Golden State Flycasters- Equipment to Support Steelhead Restoration
  » Southwest Council, San Diego Fly Fishers-Bio Assessment of Nine Mile Creek
  » International, Turneffe Atoll Trust, Building Alliance Momentum for Turneffe Atoll Habitat Protection
  » Ohio Council, Mad River Clean Sweep
  » FFI Steelhead Committee, Wild Pacific Salmon: A Threatened Legacy
  » Oregon Council, Central Oregon Flyfishers, Spring Creek Acclimation and Youth Angling Pond
FLY FISHERS INTERNATIONAL’S ROLE IN CONSERVATION

» Conservation Partnerships—collaborating with likeminded groups
  » KeepEmWet Fishing™
  » Single Hooks
  » Theodore Roosevelt Conservation Partnership
**FLY FISHERS INTERNATIONAL’S ROLE IN CONSERVATION**

» Conservation actions
  » Public lands and waters of the United States
  » Sign on letters
  » Position letters on specific issues

» Whitlock Vibert Box Program
  » 5000 boxes sold in 2017 generating revenue for FFI

» Scholarship and Internship Program
  » Scholarship program will provide $2,000 annually to a graduate student in fisheries
  » Internship program will provide $2,000 annually to an undergraduate in fisheries
Books


Websites—Just a Start

» Theodore Roosevelt Conservation Partnership

» Fly Fishers International

» American Rivers

» Trout Unlimited

» The Nature Conservancy
» Give us a call (630-533-1009) or email (dpeterson3@charter.net) if you’re coming to Michigan, and we’ll go fishing.

» Please take a few minutes to evaluate the workshop before you go.
THE TESTAMENT OF A FISHERMAN

I fish because I love to;

Because I love the environs where trout are found, which are invariably beautiful, and hate the environs where crowds of people are found, which are invariably ugly;

Because of all the television commercials, cocktail parties, and assorted social posturing I thus escape;

Because, in a world where most men seem to spend their lives doing things they hate, my fishing is at once an endless source of delight and an act of small rebellion;

Because trout do not lie or cheat and cannot be bought or bribed or impressed by power, but respond only to quietude and humility and endless patience;

Because I suspect that men are going along this way for the last time, and I for one don’t want to waste the trip; because mercifully there are no telephones on trout waters;

Because only in the woods can I find solitude without loneliness;

Because bourbon out of an old tin cup always tastes better out there;

Because maybe one day I will catch a mermaid;

And, finally, not because I regard fishing as being so terribly important but because I suspect that so many of the other concerns of men are equally unimportant – and not nearly so much fun.
TAKE A KID FISHING!
FLY FISHERS INTERNATIONAL has been an organized voice for fly fishers since 1964. We represent all aspects of fly fishing—from the art of fly tying and casting instruction, to the protection of and access to fisheries around the world.

A 501c3 non-profit organization, FFI is driven by three fundamental pillars: CONSERVATION, EDUCATION, AND COMMUNITY. Together, these pillars provide the foundation for our vision of the future of fly fishing—a future in which anglers have access to prime waters and fish can thrive in healthy, protected habitats; in which learning never stops and artistry is not forgotten; and that recognizes the true value of camaraderie. If we want this legacy to be experienced by future generations, we have to work to make that happen.

JOIN FLY FISHERS INTERNATIONAL TODAY to help ensure that fly fishing can continue to instill the kind of passion it does today in so many of us.

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