

Adapting Fisheries Management in Northern Minnesota to a Changing Climate November 28, 2007

Challenges:

Biological/stocking:

- The complexity of interactions in food chains in aquatic systems makes it difficult to predict what the affects will be in the future.
- Uncertainty of winners/losers in climate change, especially cool water fisheries
- Widespread fish distributions mitigates some CC impacts - adaptation?
- Loss of prey species (cold water) and impacts on walleye. Climate change impacting Cisco in Mille Lacs (example)- remove important forage species, decrease productivity in Mille lacs of that species. Change of prey? Yes, cisco are energy rich food source though. Gizzard shad fill that niche in warmer climates. SE U.S. problems with reservoirs - recruitment of young shad sporadic.
- Raising whitefish for stocking - no increase in return over 15 years. Should we continue doing this? Culturally important species.

Societal challenges:

- Biggest challenge may be angler component. In the Bass/panfish region people want walleyes. Difficult to convince anglers to switch species.
- Leave no child inside - losing connection to outdoors
- Economic businesses tied to fishing (walleye) - how to help them?
- Climate change and related impacts on natural resources, we aren't getting the message to the public.

Water quantity and quality issues:

- Central part of state, drought - challenge is loss of water in streams. TMDL (Total Maximum Daily Load) in marginal trout stream, dried up due to irrigation and drought.
- CC and reservoirs maintained at high water levels. CC will amplify effects on water system, greater bounce of reservoirs. Lakeshore owner response
- Run-off question. Future scenarios. Does lake stratification make a difference? Yes, increased oxygen loss due to nutrient increase from run-off in cold water layer is a potential problem.

Data issues:

- Index of Biotic Integrity (IBI) - in these will change over time, IBI's used to regulate - will need new baselines. Effects on policy decisions.
- Disparate data sources, who is collecting what. EPA started a system, PCA has one.

Opportunities:

- Increase opportunities for **collaboration**, both within agencies and across agencies, involving communities and local governments.
- **Education** of the public, try to bring the public along at all levels. Outreach. Along those lines, engage public through lake associations, etc.
 - Sentinel lakes program - are property owners involved (yes, in the plan). Ice out, lake level monitoring, citizen lake monitoring program (PCA) are all planned within SLICE program.
 - Involving citizen groups in monitoring and assessment both educates and creates interest.
- **Marketing**
- **Lead by example** through CO2 reducing efforts (agency based).
- **Management:**
 - Replacing cold water prey species (cisco) with cool or warm water species? Gizzard shad would have big impacts on perch populations. Lake Pepin, freshwater drum are utilized somewhat but not present in Mille Lacs. Perch production may increase naturally with increased warming. Risk?
 - Monitoring - Do we know what temperatures lakes are peaking out at? Potential new research through DNR targeted to identify cold water refuge lakes. DO and nutrients?
 - Mitigating impacts we have potential to control

Strategy 1:

EDUCATION: Educate people about what is going on in regards to fisheries and climate change effects.

Techniques

- Target younger generation.
- Public education - involve monitoring piece.
- Education - MinnAqua using teachers to reach kids, educating educators.
- Conservation Volunteer articles on climate change and impacts on fisheries
- More visibility and cooperation
- Managing expectations (can't have it all...clear water/no weeds)

Strategy 2:

COLLABORATION: across agencies, within agencies and between communities, individuals and local government.

Techniques

- Shared, centralized, easy to use data bases
- Efficient use of resources
- Lead by example

Strategy 3: MARKETING

Techniques

- Give a *consistent* message. Fishing is part of heritage, opportunity to talk about climate change. Successful model in 2007 on Take-a-Kid Fishing promotion. One message - we need to create one message whether it's cisco, bass, walleye, etc. (good fishing, healthy environment) and hit it repeatedly. Marketing (7 times - 7 different ways). Real story is telling that there will be change.
- "Climate change will affect fishing" [example]
- Through regulation manuals (DNR), billboards - incorporate messages into these
- Relate issue/message to our heritage

Notes by Annette Drewes