

Biocomplexity Project Retreat
March 1-3, 2002
Trout Lake Station
Boulder Junction, WI

Friday, March 1 – Departure From Madison (Center for Limnology parking lot)

12:00 pm – First van leaves from CFL (Driver TBA)

2:00 pm – Second van leaves from CFL (Driver TBA)

4:00 pm – Third van leaves from CFL (Driver TBA)

6:00 pm – Last van leaves from CFL (Driver TBA)

10:00 pm – Last van arrives at Trout Lake, Evening Social in Juday House

*Departure times are subject to change depending on schedules of passengers

*Each van is responsible for own dinner or food (Dinner will not be served at Trout)

Saturday, March 2 – Biocomplexity Retreat in Main Lab of Trout Lake Station

7:00 am – Breakfast in Juday House (bagels, donuts, coffee, juice)

8:00 am – Opening address, Introductions (Carpenter, Kratz)

8:15 am – Report on Cross-Lake Survey (Finkelstein, Van Egeren, Parara, Sugden-Newberry)

9:15 am – Report on CWD manipulation and modeling (Havlicek, Sass)

10:15 am – Break (coffee, donuts)

10:45 am – Report on Sparkling Lake manipulation (Roth, Magnuson)

11:15 am – Presentation by Steve Gilbert (WDNR) on rainbow smelt

11:30 am – Report on ecological economics (Provencher, Obert)

12:00 pm – Lunch (sandwiches catered to Trout Lake Station)

*Names in parentheses are in charge of organizing reports

*Schedule will be strictly enforced

*1/3 of allotted time should be allocated for questions and discussion

1:00 pm – Biocomplexity break out groups

Cross-lake comparison (Kratz, Finkelstein) – Library of main lab

Sparkling Lake manipulation (Roth, Magnuson) – Basement lobby

CWD manipulation (Sass, Kitchell) – Juday House

Ecological economics (Provencher, Obert) – Merrill Cabin

Points to Discuss within each Break Out Group

- Over the next year, what are the scientific questions that we need to answer?
- What scientific papers are planned for next year and who are the lead authors?
- What are the field plans for this coming summer? Who is going to perform these tasks?
- What permits are needed to accomplish these field plans?
- What are the staffing needs for the summer field season?
- What information do you need to learn from the other break out groups? What information do you have to offer the other break out groups?
- Are there any outstanding uncertainties regarding your future research plans?

2:30 pm – Regroup and break in TLS library

3:00 pm – Discussion of logistics, science, and summer schedule

5:00 pm – Closing statements and breakup, evening social in Juday House

6:00 pm – Dinner and evening social in Juday House (pizza from Sayner Pub)

*Names in parentheses will lead each break out group (task list TBA)

Sunday, March 3 – Biocomplexity Retreat in Main Lab of Trout Lake Station

7:00 am - Breakfast in Juday House (bagels, donuts, coffee, juice)

8:00 am – Report from cross-lake comparison break out group

8:30 am – Report from Sparkling Lake manipulation break out group

9:00 am – Report from CWD manipulation break out group

9:30 am – Report from ecological economics

10:00 am – Ending plenary

11:00 am – **Packup and depart TLS, optional field trip**

12:00 pm – Optional tour of major biocomplexity project lakes (Roth, Sass)

3:00 pm – Last vans depart TLS

7:00 pm – Last vans arrive at CFL

* Each van is responsible for own lunch or food

*Optional field trip will visit Little Rock Lake, Sparkling Lake, and WDNR experimental lakes area (boots and warm clothes will be essential if attending)

What to bring to the Trout Lake Station

Sleeping bag, Pillow or pillow case, Towel, Personal toiletries and items

Trout Lake Station Contact Information:

Trout Lake Station
10810 County Hwy N
Boulder Junction, WI 54512
(715)-356-9494 and (715)-356-9596

Minutes, Biocomplexity Retreat Plenary

Sunday, March 3, 2002

Trout Lake Station

Updating Biocomplexity website, Barbara Martinez

<http://biocomplexity.limnology.wisc.edu/>

See attachment for requests.

Data management, Barbara Benson

- The data-management group maintains an Oracle database, currently the BioComplexity data in Oracle is mainly cross-lake comparison
- Why would you put your data in Oracle? It has the capacity to hold large data sets, there are analysis tools, there is some interest beyond the BioCom grant, and possible data sharing opportunities.
- The data team developed a prototype to access data on the web, and Barbara Benson mentioned holding a workshop in the spring if there is interest.
- View the prototype on line at: <http://biocomplexity.limnology.wisc.edu/>, go to Site Events—Staff Access—user name& password, contact btmartin@facstaff.wisc.edu.
- This is a prototype for LTER but Oracle is easy to extend to BioCom
- The database keeps track of users, eventually it will go public; you need to set up a password
- In the database, you can choose your fields (fish and chemical limnology; choose dataset vs. metadata; the output can sort, filter by lakes, gear types, species)
- Output formats: Excel, .htm, xml—a data exchange format
- Groups in BioCom can decide if their data should go into Oracle. Flat text can be included, but others would not be able to query for it (possibly have a library for flat text documents?)
- Barbara welcomes comments/suggestions on this database

BioCom Sandbox, Steve Carpenter

- Web tool for organizing discussion groups in BioCom
- Two ways to access the BioComplexity sandbox, our web tool for organizing discussion groups: From the BioCom web site, go to **site events, staff access only to sandbox** (contact btmartin@facstaff.wisc.edu for user name&password)
- Alternatively, you can click on the 'X' in 'BIOCOMPLEXITY', on our main web page.
- To set up a discussion group, please email Dave Balsiger (dbalsiger@facstaff.wisc.edu) and he will set you up.
- Sandbox allows you to set up a password-protected discussion group, organize files (upload, download, leave messages etc.)

Cross-Lake Comparison Update, Mara Finkelstein

1. Over the next year, what are the scientific questions that we need to answer?
 - Continue to answer the same questions as last year, what are the differences in lakes across a gradient of types (developed/undeveloped; low/high conductivity)
 - Add more data! This year the team plans to continue to collect data at the extreme ends
2. What scientific papers are planned for next year and who are the lead authors?
 - Group feels it needs to collect more data before anything is published
3. What is the field plan for this coming summer? Who is going to perform these tasks?
 - Same as last summer plus an adjustment of the CWD methods including creating an index of isolation, and the spatial structure of CWD
 - If natural disturbance occurs, the group will follow up on this and take CWD measurements
 - Michelle and Scott plus 4 hourlies in June & July, 1-2 hourlies in August; staff might be tight in July; help from down south is welcomed.
4. What permits are needed to accomplish these field plans?
 - The group will ask private homeowners' permission and they will do this before field season (Michelle and Scott)
 - fish collection permit? Last year the group worked under the LTER permit, this was not a problem

- There are 2 new wardens the group needs to interact with them early
- Group plans to email a list weekly of activities and inundate the community with too many messages
- Suggested that they remember to notify those on public camping grounds before sampling

5. What information do you need to learn from the other break out groups?

Ecological economics, stratifying lake choice by lake association, is this important or are there other things more important to consider in choosing sampling sites?

Lisa Obert—Econ group is incorporating the lake association data now somehow into the model and the economics group will get back to Cross Lakes with what is considered important

6. What information do you have to offer the other break out groups?

TK--Camp Lake has low conductivity and low development. Let TK know of other lakes, which might be included in X-lake—these are not randomly selected lakes.

Points discussed:

- Why does lake association matter? Restrictive rules by associations possibly restrict choices to locate on lake; the activity might be based upon minute factors; Is there an association and when was formed, these might be important variables
- Jeff Bode (WDNR) has a database of lake association activities, they can't actually pass ordinances; townships might be an important factor to examine.
- Buz Brock—We have an interest in the initial settlers...culture develops around the lake, they are trying to track initial culture formation, when did they form? What did they do? It's possible to test for existence of founders' effect, ie. are the lakes run with "Leopold" or "jet skier" ideals?
- Jeff Bode—Volunteer monitors on the lakes might be good indicator...

7. Are there any outstanding uncertainties regarding your future research plans?

- The current CWD methods, group wants to change these
- Create an isolation index; get something wider than 0.5 m contour, sample littoral zone instead of single transect in place now?

GP—One way to possibly approach sampling--CWD, is there some nested or hierarchical sampling method/model you can create? Measure sampling at different scales related to fish habitat? What is the patchiness and clumps at lake level scale of CWD?

SRC—Solve this by phone with a fish person and Monica

Sparkling Lake Update, Katie Hein and Stacy Lischka

1. Over the next year, what are the scientific questions that we need to answer? The group stressed the importance of the questions in [Blue](#):

- **Does the foodweb begin to change with rusty/smelt removal?**
- **Can we actually decrease rusties and smelt? (Overarching Question)**
- Will *O. virilis* come back?
- Will we get a density-dependent growth response of rusties/smelt?
- Will rusty catches decrease?
- Do rusty movement and distribution change with removal?
- Is there a density-dependent influence of male on female catches?
- **Does change in fisheries regulations alter predation on rusties and smelt?**
- **Does fish population growth decrease with decreases in rusties and smelt?**
- Do macrophytes return, and in what composition?
- **Can smelt be removed in spawning habitat efficiently?**
- How should the removal strategy for rusties change through time?
- How does size-selective removal and predation influence the population growth rates of rusties and smelt?
- How can we remove rusty females and juveniles?
- How can we remove spawning smelt?
- Will predation on insects increase?
- **How and should we reestablish perch, cisco, and *O. virilis*?**
- **What should we do to communicate to the public?**
- What are the short- vs. long-term patterns of recovery and restoration?
- How do the removals influence biogeochemical cycles?

2. What scientific papers are planned for next year and who are the lead authors?

The group brainstormed 3 types of pubs: technical, popular press, and the broader aspects of project

Technical/Popular press

- Popular paper to Lakeland Times on the restoration and damaging invaders in Sparkling Lake
- Reproductive and population biology of rainbow smelt related to control (Journal Fish boil, Tans Amer Fish Soc)
- The distribution of *O. rusticus* in relation to their behavior, spatial, and environmental types in Sparkling Lake.
- Approaches to restoration and management of exotics. (BioSci)
- Temporal heterogeneity of diet of predators in relation to exotics (Can J)
- Removal of smelt and crayfish (LTER Network News)
- Description of reproduction and gill net selectivity of smelt
- Responses of *O. rusticus* to removal, catchability, movement, population estimates
- Broader aspects:
- Model paper on ecosystem model, etc.
- Biotic controls on inversion lakes of exotic crayfish with K.W.
- Rainbow smelt the good, the bad, the ugly
- Native species resilience in system and hysteresis
- Size selective predator removal on populations in systems
- Despensatory (?) dynamics modeling and response

3. What is the field plan for this coming summer? Who is going to perform these tasks?

Staffing:

BR needs 1 REU, 2 hourlies

Brian will follow last year's system:

- Every 2 weeks tag fish, RB, WE, SMB, YP, LMB, PS from May 16-Aug 30; get diets for 15/each/period
- Mark/recapture
- Scales, length, width
- LTER sampling
- Big fyke nets in spring for WE, 4-5 days, tags and Brian diets
- Fish diets from 15 individuals.

Macrophytes:

- Repeat last year's 8 transects to 3m/every linear m; identify, % cover, substrate, at same sites

Smelt:

- Spawning removal in April using fyke nets and beach seines with Steve Gilbert

- Summer removal every 2-3 weeks of every month (horizontal gill nets every day over 2 weeks) plus sonar population estimates

Crayfish: this needs more development before field season

- Plans not as clear, females release juvs at end of June, monitor this then trap when juvs are off, trap through July (labor crunch at this time)
- More time to data collection vs. removal? Group needs to prioritize what is important
- Suggests counting individuals but not sexing? Not everyday...tracking movement?
- Would summer data last would be “enough?”
- Group decided it is time consuming to have mark/recapture study and intensive removal

4. What permits are needed to accomplish these field plans?

- Can group work under the scientific collecting permit? Not supposed to eat catch under that permit, but check with SG.
- Last year, group uses smelt in crayfish traps; maybe donate to Duluth aquarium? Crayfish were donated to Pecks Wildwood Center
- Is there a bi-catch issue? Steve Gilbert is fine with this, bi-catch is minimal
- Steve Gilbert and shocking...Brian Roth will help him tag fish for pop estimate on walleye at the beginning of the season and collect diets to see what spawning WE are eating.

Whole lake CWD Manipulation, Jim Kitchell

1. Over the next year, what are the scientific questions that we need to answer?

- What is the affect on Bass, expect bass/perch system to change

2. What is the field plan for this coming summer? Who is going to perform these tasks?

- Moving this manipulation to Camp Lake, already discussed with SG; Camp is similar to LRL
- SG offered background data from 1947 and 2000, he recommended working here, Camp also has lots of background data on Hg survey; lake has LMB and BG
- Survey 2 basins this year, snorkel and tagging fish (2 colors for diff. basins)
- Winter of 02-03, put tree drops onto ice
- Creel census and discrete tethering for “ring of death” in Camp lake
- Looks “disconnected” might be site to offer opportunities in future

- Summer 02, need beaver trapper and blaster...hire pros to remove beavers. Greg and chainsaw and ATV will pull logs out of lake.
- Team will also identify nest sites and how they change with removal of CWD
- Help: 1 REU, 1 hourlie
- SRC and JK will take care of contacting UW news service for public knowledge

TK—Does this need to involve blasting? The Basin is the LT site for Hg, as far as public relations go we need to know about blasting to inform others. Does blasting release Hg?

Maybe released in short term during disturbance of removing logs; curtain is not secure and fish cross, beavers aid in this problem. Get a good look at it this spring to decide on blasting.

- Ideas for removing or adding CWD: Crane, helicopter, cables, National Guard
- We are going to cause a disturbance...probably not enough money for helicopter.

3. What information do you need to learn from the other break out groups?

- Should Cross-Lake team conduct a Comparative survey on Camp Lake?
- Give chainsaw to Anna SN
- Talk to new wardens, make sure they are aware of what is going on, there are no homeowners on Camp, very little CWD, too

4. Are there any outstanding uncertainties regarding your future research plans?

- Is it possible to remove all CWD?
- Maybe make new regulation to reduce access? These would not in affect until 2004...not confound CWD manipulation with change in fisheries
- Make sure curtain is secure; If it's fish permeable, ruins experiment

5. Public Relations:

- Make sure local press well informed, Lakeland Times is local paper, need story on wood removal and cross-lake comparison. Also have university press release statewide or regional. Need to coordinate
- Get to Terry Devit? Early. Maybe have a media day while removal of wood; Tim and Jim should come up with media plans.
- Participate in lake association fair, Greg Sass and Brian Roth

- Open house for Vilas County Board members, extend invitation
- Letters to Sparkling lake residents

Points Discussed:

TK—The concern is to minimize disturbance in the reference basin. From Hg viewpoint, we want to minimize deposition of Hg...stirring up sediments

JJM—Before the experiment, patch the curtain and make sure perch aren't moving from one basin to the other.

Ecological Economics, Lisa Obert

1. Over the next year, what are the scientific questions that we need to answer?

- Econ group plans to continue questioning the notion of negative interactions in development model
- Develop the model into classes of different lake types and include tipping scales

2. What scientific papers are planned for next year and who are the lead authors?

- Econ group will develop a working paper in 1 yr, Bill Provencher lead author
- A discussion on paper on beavers and choices of lakes and decisions and people and lakes and movement...and neither will leave an area until necessary, Tim Allen

3. What is the field plan for this coming summer? Who is going to perform these tasks?

- Develop data on lake association and history; add in further lake characters like water color and fisheries
- Estimate model parameters (Bill and Lisa) get back to Tim Kratz for more ecological data by April

4. Staffing

- RA will replace Lisa in July

4. What information do you need to learn from the other break out groups?

- Cross-fertilization of break-out groups, need to integrate BioCom data into model
- Residuals on parameters—development might explain ecological data (uncertainty, 2-way approach)
- How to work in the lake association data (Garry, Buz, Tim, Lisa, Bill)

Points discussed:

- There were useful ideas within this group to modify the model on lake color, and during the summer to look at lake association more closely.
- Need human subject approval only if surveying people, and we are getting blanket approval under LTER

Cross cutting groups:

Field and Logistics, Scott Van Egeren

Relevancy of groups to one another and meeting each other's goals, etc:

- Econ group wanted more eco variables, that seems worked out. Michelle and Scott coordinate with econ on lake associations and selection
- Smelt removal: Steve Gilbert offered to remove smelt in spring with DNR fyke nets, we need to pick up smelt from boat landing, Michelle or Scott will take care of this
- Stacy in charge of finding freezer space, measurements by Stacy and recruiting volunteers, Brian and Greg will offer help
- Public relations at Sparkling, contact land owners early via letters, possibly a local or statewide article
- Hourlies—Cross Lakes, 4 (in July, “free” in August, 1 goes to Anna; Brian and Greg REU each, Greg 1 hourlie bass spawning and CWD; 1 hourlie for crayfish and smelt removal, work with Stacy.
- Field crew, 10 total (7 hourlies, 2 REUs, Stacy) each person should write up descriptions for their hourlies
- Put in housing requests by April 1st. Tim will file a request for 7 unspecified hourlies; Brian and Greg include thier REUs in requests

- At Trout Lake—anticipate a crowded year. Want to encourage faculty participation at TL, set aside Halverson for faculty visits/

Gear:

- TL will be short on vehicles, boats will be set at lakes, coordinate rides among field crews; renting 4wd is the way to go;
- Buy at most 100 more crayfish between cross-lakes and crayfish (debate about the exact numbers)
- BioCom does not anticipate major purchases this year
- There is no support for capital equipment in BioCom proposal
- 10 hourlies is 2x budget, but we might be able to do it (02,03 are planned heavy field years and allocate spending unevenly)
- SRC will contact PIs soon on revised budget plan...did not do anything until March 2001 therefore banked money for hourlies; REUS won't know until April but 2 banked; some endowed funds for undergrads

Models and Analyses, Garry Peterson

The group planned models, and how can people create models in due time...

Models that exist:

- Zoo 400 - Forest->CWD->Fish
- CWD/disturbance
- Proposal model crayfish
- Sparkling Lake ECOSIM model
- Sparkling lake autoregressive
- Age structured predatory/prey crayfish model
- Leslie matrix fish/crayfish
- Bioenergetics
- Stochastic optimization of harvest w/ fish/CWD
- Ecol.-econ development dynamics model
- Kernel biogeochem lake model
- Ives biosimplicity linearizing the nonlinear
- Effort allocation models
- CA of crayfish spread
- Hi-gain/Lo-gain Beaver model of development
- MAPLE scenarios

Analysis:

1. Gregg - CWD and fish response

Behavior and growth rates and CWD

Adult bass vs. juvenile, where are fish, how do they grow?

Variation in predation risk

2. Mara - Lake Structure

Variation in Macrophyte abundance and diversity

Along gradients - substrate, nutrients

Variation in CWD with development

3. Ana - Riparian Forest (Forest->CWD)

Forest in areas of Hi vs. Low development

What are changes in forest in developed areas

What do natural disturbances?

4. Brian - Extinction

Crayfish & Smelt - population, size, growth rates

Foodweb - stable isotope, fish populations, YofY, snails, macrophytes

5. Sara - Lake dynamics (200 - 8000 yrs)

Cores from several TBA lakes

Fire history

Some TBA interesting lake variables

6. History of invasions in Sparkling Lake

Changes in fish community structure

7. Group - Further mining of cross-lake data

Integration:

- Importance of stage-structured models for interpreting
- Results needed for interpreting species removal results
- Need to get good life history data for Smelt and Crayfish fecundity, sex
- More thinking about Lake types

No development (public isolated lakes)

Developed lakes (Little -> Lot)

- Three variables

Fast: predator-prey (vulnerability)

Medium: fishing movement

Slower: CWD dynamics

Points Discussed:

- Need to think more about movements of fishing effort—information, learning, fisher types: fixed, dynamic, tribal (D. Beard's work)
- Measure lake metabolism in experimental lakes?
- Analysis of existing data—What are main clusters? What are strong gradients?
- Thinking about how to look at CWD at different scales (large lake scale survey, medium patches, fine structure)?
- Include snails? Plans to include in models/get more field data.

- How does CWD work? Who hides and feeds? Need to look at bugs on logs – How do fish interact w/ bugs on logs, could this be an REU job?
 - Diet analyses? Not in Cross-Lake comparison, but in the whole-lake experiments
 - Variance of CWD and scales; get in boat count cottages and logs rather than transects?
-
- Need sophisticated statistical thinking about x-lake analysis
 - Need to think about ecosystem change due to community/population manipulations (e.g. what are P cycle impacts of species removal)
 - Measurement – bioenergetic modelling
 - Photogrammetry, count from air?
-
- Scott and Michelle did whole lake counts of CWD in LRL; have GPS locations of logs
 - Kernel Model: intent, a simple model of whole lake, food web, P, N, connected to fishing; lake eco model with few plug-in parameters and use for multiple sites build spatially explicit model of lakes of Vilas Cty.

In the context of BioCom, at the ecosystem level, is it still biocomplex?

- While add CWD, watch an increase in primary production; we have some calibration at UNDERC
- Cascade project, periphyton carbon...use of stable isotopes but expensive; change in C13 for certain fish...need to find additional funding if get serious about it. Metabolism buoy in camp lake for time series of metabolism. Also in LRL
- As crayfish decline, is there more benthic algae, colleague from Mich. will collect these data

Are we wired to other BioCom sites? The Web is an important connection (see requests for website below)

- NSF held a cross-site workshop in Nov. Great intellectual span, 2 sites striking 1. Alternate states of marine ecosystems 2. Simon Levin and interactions of N and P at different spatial scales in aquatic and terrestrial systems; however, there is no formal obligation to be linked to any other BioCom group
- Invite to meeting, education component of BioCom, K-12 education across BioCom sites; some have funding for this, not ours, but will send someone if they want to go.
- Sara—human and ecosystem modeling, another BioCom site she is working with, UW might benefit from interacting with them

Updating the BioComplexity Website:

<http://biocomplexity.limnology.wisc.edu/>. Please send any additions to Barbara Martinez, btmartin@facstaff.wisc.edu. The following is a list of the things we would like to post on the site.

Data:

<http://biocomplexity.limnology.wisc.edu/data.htm>

Anything. Right now the page says “under construction.”

Models:

<http://biocomplexity.limnology.wisc.edu/models.htm>

Again, this page displays “under construction.”

- Something from the lake-wood modeling team from Monica and Steve’s class last semester (Greg Sass and Brian Roth?)
- Any other ideas certainly are welcomed. Send them to Barbara

Publications:

<http://biocomplexity.limnology.wisc.edu/publications.htm>

Please check the posted .pdf file, if you have any additions send to Barbara. We will also include links to “working papers” on this page.

People:

<http://biocomplexity.limnology.wisc.edu/people.htm>

We added the graduate students and techs to this page. If you have a link to a personal research site, send Barbara the link. If you don't have a personal site, it might be a good time to put something together.

Courses:

<http://biocomplexity.limnology.wisc.edu/outrcourses.htm>

The following courses are listed with links on the BioCom site:

Economics 606 (syllabus); Zoo 510, Ecology of Fishes; Zoo 511, Ecology of Fishes Lab; Zoo 535, Ecosystem Analysis; Zoo 725, Ecosystem Concepts; Zoo/For/Bot 879, Advanced Landscape Ecology

If you have additions of courses related to BioComplexity, please send the links or a description to Barbara.

Site Events:

<http://biocomplexity.limnology.wisc.edu/public.htm>

This page will have links to agendas, minutes, and it will list upcoming BioCom Related events.

Links:

<http://biocomplexity.limnology.wisc.edu/links.htm>

The following links are on the BioCom site already. If you have additions, please let Barbara know.

North Temperate Lakes LTER, Trout Lake Station, Center for Limnology, Environmental Remote Sensing Center, Microbial Observatory, Resilience Alliance, University of Wisconsin – Madison, Weather (enter zip code 54512)

Pictures—if you have any interesting fieldwork photos to decorate the pages with, send them along.

Attendees March 1-3

Name

Barbara Benson
Brian Roth
Greg Sass
Mara Finkelstein
Anna Sugden-Newbery
Tanya Havlicek
Lisa Obert
Joe Dan Rose

Neil Kmiecik

Garry Peterson
Bill Provencher
Sarah Hotchkiss
Tim Allen
William Brock
Anthony Ives
Jim Kitchell
John Magnuson
Steve Carpenter
Barbara Martinez
Michelle Parara
Scott VanEgeren
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Organization

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Graduate student, zoology
Graduate student, zoology, CFL
Graduate student, ag&appl. Econ
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Commission
Great lakes Indian Fish and Wildlife
Commission
Post-doc
Professor ag&appl. econ. via phone
Professor, botany
Professor, botany
Professor, economics
Professor, zoology
Professor, zoology, CFL
Professor, zoology, CFL
Professor, zoology, CFL
Program Manager, CFL
Technician, Trout Lake
Technician, Trout Lake
Trout Lake Director
Undergraduate
Undergraduate
Vilas county Lakes Association
WDNR
WDNR
Guest of Buz Brock
Ives prospective student