

ILBM GOVERNANCE PROJECT

FIRST YEAR ANNUAL REVIEW (MARCH 3-7, 2009)

3 MARCH 2009

Convene at 9:30 am

- Participants welcomed; introductory comments from Masahisa Nakamura, including review of weeks schedule, intention of workshop, etc.
- Personal introductions all around.

GIS TOUR OF LAKE BASINS – Tom Ballatore

- GIS-based tour of lakes in ILBM project, illustrating utility of GIS, combined with Google Earth and LANDSAT data;
- Potential significance of physical dimensions discussed (e.g., lake basin area:lake area ratio);
- The project lake data base is weak on international lakes;
- Although the ILBM focus is on surface drainage, must also consider atmospheric effects (e.g., atmosphere is largest source of P load to Lake Victoria);
- Reservoirs usually exhibit large lake basin area:lake surface area ratios

(ED: Prepare paper on significance of lake area:basin area ratio and lake volume:basin volume ratio, and the water quality implications thereof; other related factors?)

REGIONAL PRESENTATIONS ON LAKE CASE STUDIES:

INDIA: (Mohan Kodarkar)

- Upper Bhima basin is very wet in upper portion (also has many dams), but descends to drought-prone areas;
- Noted that both China and India have problems with access to sanitation; Jal Dindi represents great approach to educate people because linked with education; reservoir at end; many upstream reservoirs on virtually all tributaries;
- Urbanization growing rapidly, along with population; estimated population of Pune City = 3 million in 2001; sewage is major problem, but also have pollution from small industries;
- Three major ongoing efforts:
 - Water Users Associations – dominated by political party in power;
 - Public Interest Litigation (PIT) – how is judiciary involved?
 - Jal Dindi initiated by local physician, mainly because of health effects on children; has rapidly caught on since first time; physician uses medical practice

to spread 'environmental word';

- Noted that both China and India have problems with access to sanitation; Jal Dindi represents great approach to educate people because linked with education;
- What actual improvements have been noted since Jal Dindi began? What types of information disseminated via Jal Dindi;
- Many Ujjani water quality/quantity issues identified, but not clear how they are being addressed;
- Ecotourism – pollution juxtaposition;
- Two new concerns: (1) Climate change and problem linkages; (2) computer simulations of potential conflicts.

RUSSIA: (Nick Aladin)

- Presentation on Lakes Ladoga (largest lake in Europe), Peipsi/Chudskoe, Ilmen lakes;
- Relatively technical discussion of the lakes; although much historical background also provided;
- Ilmen Lake upstream from Novgorod (established about 1,150 years ago); small, shallow lake, with 0.5 yr residence time;
- Little information provided on lake problems or how managed;
- Lake Ladoga not discussed (too large in content and context for this presentation);
- Lots of historic, political considerations in regard to governance (territorial claims; etc);
- Many papers published on these lakes, but in Russian language; Russia and Estonia rarely discuss Lake Peipsi/Chudskoe jointly;
- From Russian perspective, Belarus and Ukraine remain a problem in Baltic Sea issues; Baltic Sea has water residence time of about 27.5 years, and behaves much like lake in regard to its hydrologic characteristics;
- Political-historical linkages often a major linkage in governance of transboundary lakes (e.g., Aral Sea).

MEXICO: (Alejandro Cuellar)

- Lake Chapala (largest lake in Mexico) provides 70% of water for city of Guadalajara (2nd largest city in Mexico; 5 million people), as well as for Mexico City;
- Basin is in 5 states, with "intense migratory dynamics";
- High biodiversity, but also many water quality/quantity problems: irrigation water

loss of 80%, with flood irrigation fields;

- Municipalities don't necessarily want to accept sewage plants built by higher government authorities because they are expensive to maintain and operate;
- Possibility of using sewage (e.g., biogas) being considered on some fronts;
- Discussed development of basis for 2007 Lake Chapala meeting and Action Plan resulting from the initial meeting;
- Noted that five previous Master Plans were produced for lake, but not implemented (partly because powerful irrigation interests can pressure poor farmers; also because irrigators see Master Plans as affecting their economic interests);
- Need stronger national/state government support to get Action Plan established; but most concern presently is at local level;
- Mexico generally a leader in water management in Latin America, but must develop basin management capabilities;
- Focus on wastewater treatment plants, but doesn't adequately address industry (source of many toxic pollutants);
- It is clear that national government commitment is needed; while collaboration with other Latin American countries also is needed, and remains a major challenge;
- National government doesn't see Lake Chapala problem because "minds too simple."

PHILIPPINES: Lennie Santos-Borja

- Laguna de Bay (largest lake in Philippines);
- LLDA – only lake management authority in Philippines; LLDA Board of Directors has authority to authorize taxes, collect fees, etc.; also engaged in range of programs, including bamboo restoration program, shoreland development and management, ecotourism, etc.
- Laguna de Bay has 11,983 ha of fish pens, 1,760 fish cages; also has zone and management plan;
- Decided last year to phase out aquaculture (DENR), but LLDA had difficulty to go head-on with them, so LLDA agreeable to let them try; difficulty is that DENR has new election in 2010, with new directors, presidents, policies, etc., so continuity unclear;
- 4 major programs identified, but more integrated in nature (four programs relate to how budgeted, rather than as separate programs);
- LLDA gets fee for wastewater discharges (exclusive of pollution penalties) in the

form of environmental user fee (EUF), being an impetus for industry to address pollutant effluents;

- Interesting climate change mitigation/carbon sequestration projects in basin
- LLDA uses Dutch Mondriaan as a simple means of illustrating water quality for Laguna de Bay;
- CDM activities (carbon finance) are being mainstreamed in LLDA operation, including methane avoidance bundle projects registered with UNFCCC (mostly composting that exchanges methane for carbon dioxide);
- Lake Lanao (second largest lake in Philippines) also discussed; it has significant biodiversity, cultural and socio-economic importance, and an ILBM management approach is urgently needed, but in security risk, making assessment and management efforts difficult.

MALAYSIA: Shahrizaila Abdullah

- Political commitment was obtained after doing groundwork on need for holistic basin management approach, including networking with both domestic and international entities;
- National initiative to address the status of quality of lakes and reservoirs in Malaysia commenced in the year 2004:
 - (1) ASM/NAHRIM conducted a desk study on eutrophication of lakes which was completed in 2005; the study reported that 62% of 90 lakes studied were eutrophic;
 - (2) Colloquium on Lakes and Reservoirs in Malaysia was held in 2007 with a view to raise awareness , address the issues and the way forward. Call for a strategic plan to manage on an integrated and sustainable basis;
 - (3) Development of Strategic Plan for Lake/Reservoir Management;
- Development of Strategic Plan undertaken in 2008 following a comprehensive process of stakeholder consultations, using LFA as a management tool, and involving the development of a conceptual framework plan and supporting component plans.

NEPAL: (Dr. Shailendra Pokharel and Dr. Kapil Shah)

- Much information provided on study lakes (Rupa, etc.);
- General lake issues relevant to Nepal were discussed in some detail, including national-level attention being paid to lakes in varying degrees;
- General lake issues relevant to Nepal were discussed, including national attention being paid to lakes Phewa, Begnas and Rupa, with national attention being paid to lakes in varying degrees;
- Nepal government providing direct support to restore physical condition of 50 different lakes;

- A lake inventory of the mid-hills of Nepal began focusing on ILBM approach; started keeping ILBM focus;
- Nepal is considering convening an ILBM workshop or conference, perhaps in October 2009, but the decision won't be made available until late June or July,

(ED: SAWC should focus on my time for biogeophysical characterization; conducting meetings to prepare TDA and SAP; perhaps to help select pilot projects) + take care of graduate student)

MEXICO: Alejandro Cuellar

- Continuation of previous Lake Chapala discussion;
- Discussed most recent Lake Chapala workshop, and increasing interest regarding condition of Lake Chapala;
- Impression was movement from skepticism on part of government to “we want to be involved....”
- Although Lake Chapala Action Plan is somewhat like child without a parent, increasing interest building at many levels on the lake.

ADJOURNED at ~5 pm

4 March, 2009

CONVENE at 9:15 am

RUSSIA: Nick Aladin presented short video on future meeting possibilities in lake-based sites in St. Petersburg environs.

JAPAN/THAILAND: Dr. Phalaraksh

- Interesting discussion on Environmental Education (EE);
- We have environmental education, but problems continue –why?
- 3 points relevant to this question; they lack:
 - Development of Methodology
 - Training of Teachers and Leaders
 - Support System
- Discussion on Environment Education in Japan, and especially in Thailand;
- -Makes great use of school children as vehicles of knowledge;
- *(MN: Water management is a human issue!)*
- Very important issue - if people were educated as to how they were disturbing the environment, they would probably not do it;

- Not clear how effectiveness of educational program was evaluated.

SOME ODDS & ENDS Masahisa Nakamura

- Reminder that an overall workshop goal is to use the lake briefs to analyze “how others did it,” rather than trying to prepare an `ideal` management framework.

(ED: LAKE BRIEFS FOR TEXAS RESERVOIRS - GET ERIC, EMILY AND/OR JASON TO HELP; PERHAPS SOME OF EMILY'S STUDENT WORKERS - SHOULD FOCUS ON LCRA [TRAVIS], GBRA [CANYON], BRAZOS [WACO] & TRINITY [RAY HUBBARD; LEWISVILLE?] RIVER BASINS; BUILD LAKE BRIEFS AROUND LAKE `IMPACT STORIES`)

LAKE SHINJI / HII RIVER BASIN (Shimane Prefecture)

- Climate change impacts on Lake Shinji – predicted changes will impact shrimp significantly;
- Climate change impacts on discharge from Hii River Basin (temperature = no significant effect, but precipitation = did have significant effect);
- Also presentation on SWAT model and its use in analysis.

KOREA: Dongil Seo

- Lakes Soyang, Chungju and Daechung (all reservoirs; only 2 natural lakes in Korea);
- Interestingly, BOD is decreasing vs. COD is increasing (and availability of sewage systems continues to increase);
- TN and TP concentrations also increasing over time;
- (TMDL = Too Many Damn Lawyers!);
- Korea (& Japan) have relatively regimented governmental structures (i.e., vertical in administrative structure); one result is that different agencies separately collect water quality and water quantity samples, with little or no collaboration to date.

SOME GENERAL DISCUSSION:

- Even with STPs, models, etc., we still have problems, and may even be aggravating them (e.g., STPs discharging concentrated pollutants, causing even bigger problems than before, etc.)

ADJOURN at 5:15 pm

5 MARCH, 2009

Convene at 9:30 am

LAKE SHIGA – Dr. Shimizu, Kyoto University

- Dioxin and micro-organic pollutants; began with regressions on about 300 small watersheds around Lake Biwa;

- About 1,000 dioxin samples used as markers, noting dioxin is hydrophobic micro-pollutant, thereby preferring to migrate to sediments and fatty tissues of organisms in lake;
- Prepared Dioxin Fate and Movement Model for Lake Biwa and Yasu River;
- Discussion of model development, calibration, sample collection, etc.;
- Determined dioxin concentrations by bioassay, and then related surface soil characteristics and dioxin concentration to estimate behavior and distribution of dioxins in the watershed; this approach also allowed estimation of other organic pollutants (e.g., PCP and CNP);
- Dioxin concentration highest in paddy soil, then forests, with very little in river and lake sediments; forest direct correlation $r^2 > 0.80$ for all three basins;
- Paddy field dioxin probably from direct application, but forest dioxin likely from incineration and movement to forests;
- To evaluate the latter, located incinerators, and used atmospheric dispersion/deposition model to estimate deposition; then estimated quantity applied and added to soil estimates of dioxin; hydrology and water quality model then used to optimize model parameters;; most dioxin in Yasu River runs off during rainy weather, while a lesser quantity comes out in 2-3 weeks from paddy fields when soils are disturbed;
- An important observation was his highlighting the complex social and economic issues that also must be addressed in attempting to address water issues, in addition to the strictly technical concerns, with special interest on human's ecological footprint.

LAKE BIWA: Ms. Sano

- Focused on use of reeds to evaluate long-term landscape changes / history in Lake Biwa basin (i.e., historical geography; handout available);
- Cultural environmental landscape analysis, lifestyle reflected in landscape, using archival maps, documents (many available in Shiga Prefecture);
- Satellite lakes (~embayments) are surrogate systems for Lake Biwa;
- Reed marshland is a secondary kind of vegetation, maintained by human activities (i.e., traditional daily work activities);
- Loss of satellite lakes and reed development are result of human activities;
- Interestingly, the case study illustrated reverse "Tragedy of the Commons" (because the surrounding communities typically owned or took possession of given wetland communities);
- Not many case studies, but primarily justification for looking at historical reed data to assess past landscape history;

- Good idea to combine historical and modeling approaches;
- Reference made to ethnic differences in commons interest in Kenya, but seems to have been lost.

LAKE BIWA: Akihiko Watanabe

- Showed what ‘water law’ meant in Japanese language; water is the left side of the character for law, indicating the two are related (right side means “to leave”);
- “Construction of new legal system” – related to integrated management of lakes and rivers;
- Discussed three concepts, including (1) Need to change rights; (2) Need for governance; and (3) Decision making process under democracy;
- Much discussion on development of legal basis for lake management; role of public and courts; who owns ‘environment’; status of lakes in country; etc.;
- During Q&A session, it was noted that Japan was a very implementation oriented nation, with coordinating committees being important;
- Impacts of various environmental laws on lakes must be assessed;
- Harmonization of existing lawyers difficult, because all the bright lawyers usually working for own departmental interests, rather than for ecosystems; local governmental code often conflicts with national government law;
- In regard to Laguna de Bay, the courts indicated that LLDA ‘law’ prevails over general law; aquaculture debate was based on different sectoral interests; the challenge is how to get people to meet, talk and come to common ground, a never-ending cycle and challenge;
- Environmental Impact Assessment Law provides necessity for EIA, but does not contain any reasonable water parameters, so can’t guarantee EIA will be done well.

MURRAY-DARLING / AUSTRALIA: Daniel Connell

- Murray-Darling (MDBC) is closed hydrologic system, making it a kind of lake; characterized by multi-layers (governmental) governance;
- MDB has 3 million people, 70% of Australian Irrigation, and subject to long-term environmental decline; low energy because rather flat, with not much water moving through it;
- Salination is major pollutant (wetlands, farmland); irrigators are fairly well-disciplined, at least the surface folks, although others are not used to cooperating (e.g., over rainfall catchment in farm dams, vegetation choice, etc.);
- Research approach is to look for the political dimension within technical documents and the design of institutions;

- Rule of unanimity required in the past for each decision between states, because no trust over multiple sequential decisions; agreements tended to be excessively detailed or excessively loose; technical types biased to keeping public out of decision-making process;
- Forcing factors include over-allocation, environmental decline, pressure to increase autonomy of producers from discretionary bureaucratic decision making, new stakeholders, demands to push cost of supply system to producers, etc.;
- Reckoned to use of a shared credit card between individuals that don't like each other, not knowing what is being charged by others, and not aware of financial problems until card overdrawn;
- MDB is effectively an open access resource; short term political considerations dominate decision making in the absence of a systems approach; in past, major decisions about who got water, how much, etc., were made by administrators and politicians;
- "National Water Initiative 2004 allowed government to step back and become an umpire; changes the game, causes, confusion, political dissent, etc.;
- Initiative is rights and responsibilities system to be introduced after environmental sustainability has been achieved (however, environment is only part of equation; in other words, what is to be made `sustainable` and has it been defined?);
- Clearly need for "Whole-of-system" water planning (equivalent to IWRM or similar approach?) do catchment-wide, basin, and whole-of-system mean same thing?
- Maximizing water-related benefits includes items like fishing, power production, recreation, etc.;
- Most recent attempt is Water Act 2007/8, which increases national government power via basin plan; removes state veto; driven by national government funds to states (but states still have lot of power, so not there yet);
- Water markets fashionable but under what circumstances are they applicable (don't fix the drought; also an agent of change' low to high value, rural to urban, production to environment , etc); also, some would think water was "wasted" under this scenario;
- Justice/equity/gender is creating legal/political power among groups that lack economic power;
- Need to acknowledge political dimension of water planning and management.
- It was noted that almost no significant lobbying against environment; rather, question is how?; economists accept ecological maintenance arguments, public supports, society-wide shift;

- Billions of Australian funds devoted to environment by both conservatives and liberal government;
- Many irrigators are old, willing to sell water, but communities worried about shared expenses, local economic and social bases, etc.
- Water markets for environment; an interesting idea, but some would think water was “wasted” under this scenario;
- (NOTE: Highlight the need of lentic waters to meet most human purposes);

ILBM AND TECHNOLOGY: Vicente Santiago / IETC

- Excellent GEO-4 map on global water distribution;
- Discussion of relationships between environmentally-sound technology and ecosystem services;
- Also went through the wetland software program (Subwet);
- Also showed WiseWet program for addressing water allocations, etc;
- Some audience observations were that a circum-lake road was an example of technology with many uses, but questionable environmental effect; further, sewerage treatment came into being because people wanted flush toilets, not a clean lake; also observed that constructed wetlands were not working in Kenya;
- Ecosystem services are examples of environmentally-sound technology (= ecotechnology?).

GIS APPLICATIONS: Tom Ballatore

- Informative lecture on how GIS can be used in lake analyses;
- LANDSAT data is available free for period from about 1973 to now (available via USGS EROS site);

Adjourn at 5 pm

6 March, 2009

Field Trip, commencing at 8 am

Field Trip Route:

Kusatsu Ohmihachiman-(Okisima)-Dainaka-Nishinoko-Azuchi-Hikone route

7 March, 2009

- Boston Plaza Hotel: International Forum on ILBM Governance Project :

“Governance Challenges and Prospects: The Biwa-Yodo Basin and some Global Lake-River Basin Systems”

Sessions:

- 1 – *Environmental Monitoring and Education in Lake Biwa* (S. Endoh);
- 2 - *Water Problems in the Lake Biwa and Yodo River basin from the Perspective of Virtual Pollutant Loads* (S. Ide);
- 3 – *Towards Integrated Basin Management in Lake Biwa and Yodo River Basins – Past and Future* (M. Hirowaki);
- 4 – *Multi-level Water Governance for Closed and Closing Systems – The Murray Darling Basin, a Case Study* (D. Connell);
- 5 – *The ILBM Challenges for Aral Sea* (N. Aladin);
- 6 – *The ILBM Challenges Facing the Developing World* (W. Rast and M.Kodarkar);

Round Table Discussion (closed session): *Developing an ILEC Strategy to Meet the Global ILBM Challenges* – ILBM Governance Project participants, JICA ILBM training course participants.

Adjourned at 7:30 pm