

Strategic Options for Improving Aquatic and Terrestrial Habitat in the Sacramento River Watershed

Updated based on input from participants at March 8, 2003 Strategic Planning Meeting

Notes: This is an evolving document which is intended grow in usefulness with use for strategic planning in the Sacramento River watersheds and other watersheds throughout California. Please send suggestions for additions and changes to Kevin Wolf kjwolf@dcn.org.

METHODS

Below are six major methods by which habitat can be restored and protected. Every goal can be advanced in some way by one of the major method categories. Different strategies may use one or all of these methods. On the "ballot" you will get to choose which two of six methods below you think are most valuable toward improving habitat in the watershed.

A. Science. Monitoring, conceptual models, adaptive management, research and the general use of science result in more successful restoration efforts and land management. Science provides information that can be fundamental to legal and grassroots initiatives.

B. The Law. Legislative, regulatory and legal decisions create the boundaries in which action can take place and determine who is responsible for what.

C. Grassroots. Letters to elected officials and agencies, public testimony, letters to the editor, election campaigning, financial and volunteer support for environmental organizations, and other actions by citizens can have a powerful influence on elected, regulatory and administrative officials.

D. Land: Purchase or Easements. Little is as permanent or as clearly beneficial as purchasing land or conservation/habitat easements on important pieces of property for restoration purposes.

E. Stakeholder Processes. Though not proven nor tested over a long period of time, the new movement towards watershed-based collaborative efforts to resolve environmental disputes holds great potential for advancing restoration efforts.

F. Management of Habitat Restoration. Once land or an easement has been purchased for habitat restoration, the "art" of restoration and long term management is critically important to the ultimate quality the habitat will provide.

G. Education, when it leads to stewardship and grassroots advocacy can result in real restoration actions on the ground. For example, education about Wildlife Friendly Farming can increase habitat for multiple species on private land.

Goals and Strategies:

A. Watershed Stakeholder Processes. *The agriculture, urban and environmental communities successfully work together to advance all the environmental and economic goals in subwatersheds throughout the basin.*

1. Fund environmental expert participation. Gain funding for environmental technical experts to participate in watershed Technical Advisory Committees (TACs). (Prop. 50 or future initiative funds, foundations, fines for water quality violations, other sources.)

2. **Gain strong environmental representation in stakeholder processes.** Work with the Central Valley RWQCB, the State Water Resources Control Board, CALFED, the legislature and others to ensure that watershed stakeholder groups have strong environmental representation and are not manipulated by property owners and business interests to avoid responsibility for making real improvements to the watershed.
3. **Develop watershed computer models.** Use Prop. 50 funds and other funds to develop watershed computer models that allow all stakeholders to use the same information to evaluate their preferred scenarios and for watershed restoration for water quality, habitat, flood management, and other benefits.
4. **Gain environmental representation in SRW Program.** Gain the funding for environmental groups to have professional staff and volunteers participate in the Sacramento River Watershed Program stakeholder process and help the resources of this program be put to the best use possible.
5. **Boycott stakeholder processes.** Boycott and lobby against the development of watershed stakeholder processes that attempt to advance clean water goals until responsibility for pollutant loads is assessed by the Regional and/or State Water Quality Control Boards.
6. **Create a Sacramento Environmental Water Caucus.** Form a Sacramento Environmental Water Caucus that can speak with one voice on major watershed issues and gain funding to have environmental experts participate in and make decisions about the Sacramento River Watershed Forum and other issues and opportunities in the watershed.
7. **Form new and better stakeholder groups.** Work with existing watershed stakeholder groups and help start new ones. In the process environmentalists help these stakeholder groups take more effective action to restore aquatic and terrestrial habitat.
8. **Restrict public funds to groups that meet legal standards.** Watershed groups receiving public funds should meet or exceed federal and state laws. Public funds shouldn't undermine public laws.
9. **Involve recreation groups.** Involve recreation groups in stakeholder processes.

B. Water Quality Improvement. *Pollution (e.g. pesticides, sediment, and water temperature) levels improve so harm is not caused to aquatic or riparian species in any of their life stages.*

1. **Require water users to pay for monitoring.** Require that users of water pay for monitoring of water quality parameters at the appropriate subwatershed level to fully document the problems and the sources of the pollutants. (How is it done and who pays?).
2. **Impose fees to pay agency oversight costs.** Enact fees on chemicals and water use to finance strong Regional and State Board programs in monitoring, Clean Water Act TMDL development, and water quality policing and enforcement programs.
3. **Gain environmental majorities on Boards and Commissions.** Gain strong environmental majorities in the Regional Water Quality Control Boards, Reclamation Board, Board of Forestry and Fish and Game Commission.
4. **Require stakeholders to pay for research.** Stakeholders invest in the research needed to determine the multiple benefits and secondary impacts of different Ag and urban management practices.
5. **Develop watershed computer models.** Develop watershed computer models that allow all stakeholders to use the same information to evaluate different scenarios and options for improving water quality at the subwatershed level.

6. **Organize citizen monitoring.** Implement citizen monitoring programs to supplement the state and local monitoring efforts.
7. **Enforce pollution laws.** Use the Clean Water Act guidelines to encourage and compel water quality violators to stop their pollution. Use legal action to sue polluters if all else fails.
8. **Restore riparian forests as filters.** Develop riparian filter strips and riparian forests to filter pollutants and improve water temperatures.
9. **Gain better access to data.** Improve access to and the quality of current and historic water quality related data and information.
10. **Conduct government funded research.** Get government support to conduct more scientific research to improve our understanding of how potential water quality pollutants and their synergic actions affect aquatic and terrestrial life and their habitats.
11. **Fully fund the RWQCB.** Fund the RWQCB so it can hire dozens, even 100 staff people to fully meet its obligations and commitments.
12. **Require permits for all dairies.** Convince the RWQCB to extend permits to all dairies, not just large ones.
13. **Organize an on-line catalog of water quality information.** Create an online catalog of the published and grey literature on the effectiveness, secondary impacts, economics, and other factors involved in evaluating BMPs other water quality information. Make it easy to enter new reports and information into the on-line catalog. Use the inventory to identify data gaps.
14. **Develop integrated conceptual models and adaptive management plans.** Create integrated conceptual models for how all pollutants of concern may be entering rivers in each subwatershed that drains to the Sacramento River. Use the best existing research to identify the major and subhypotheses for how and where the pollutants enter into the streams and groundwater. These hypotheses then become the basis for developing scientifically based adaptive management plans in these watersheds.
15. **Control urban storm water.** Use all the tools available to control urban storm water runoff.
16. **Work with Ag Commissions and RCDs.** Work with Ag commission and RCD's to help landowners reduce their pollution.
17. **Use fines to fund monitoring/enforcement.** Use polluter fines to fund monitoring and enforcement
18. **Target grading and vegetation removal.** Target grading and vegetation removal
19. **Protect groundwater quality.** Stop septic tanks, well heads and other sources of groundwater contamination.
20. **Impose fees on urban water users** to fully fund upstream water quality enforcement.

C. Instream Flows. *Stream flows in their seasonal and daily variations support all life stages of the species.*

1. **Utilize FERC relicensing opportunities.** Fully use Federal Energy Regulator Commission relicensing opportunities throughout the watershed.
- 2... **Evaluate efficient water practices on stream flows.** Conduct research and computer modeling to evaluate how widespread application of efficient water management practices could increase stream flows. Use this information to require that agriculture improve its practices.

3. **Exploit conjunctive use opportunities.** Evaluate and exploit groundwater/surface water conjunctive use opportunities on a subwatershed and Sacramento watershed level to help ensure that such programs enhance and don't harm instream flow needs for aquatic life.
4. **Restore upper watersheds.** Institutionalize funding of upper watershed restoration (e.g. meadow restoration, road removal) through water use fees on water leaving the area of origin.
5. **Craft a Programmatic EIR for water transfers.** Develop Programmatic EIR for water supply transfers in each subwatershed in the Sacramento Valley. Use computer modeling so that stakeholders can better evaluate the cumulative impacts of both small and large transfers on instream habitat.
6. **Measure stream flows and groundwater levels.** Increase monitoring and measurement of stream flows, water diversions, groundwater, application and runoff rates, and other information needed to evaluate all the impacts of transfers and water management practices.
7. **Access to water measurement information.** Improve access to and quality of current and historic ground and surface water measurement data and information.
8. **Research and improve efficient water use in Ag.** Conduct more research and enact programs to increase efficient use of water in agriculture.
9. **Oppose the South Delta Improvement Project.** Oppose the South Delta Improvement Project because it will end up harming timing and duration of and the quality of Sacramento River flows for its own habitat needs.
10. **Stop USBR Sacramento CVP contract renewals.** Stop the US Bureau of Reclamation from resigning contracts for Shasta project water that allows for continued wasteful and unreasonable use of the water, that violates the Central Valley Project Improvement Act, and that doesn't charge farmers for the real cost of the water.
11. **Improve urban water conservation.** Decrease water use in urban landscaping and household use through changes in General Plans, planting ordinances, education, parks and greenbelts, water meters, low flow toilets etc.
12. **Develop baseline stream conditions before water transfers.** Establish baseline species conditions in all streams affected that may be affected by inter-basin water transfers, whether from decreasing flows or increasing flows that come from water being transferred from an stream.
13. **Conduct full, valid EIRs on transfers.** Before any transfer or new diversion can take place, a full EIR should be undertaken. No more environmental assessments or one year transfer waivers.
14. **Stop new dams.** Stop the expansion of Shasta Dam, the construction of Sites Reservoir and other dams or on/off stream storage facilities that would damage instream flow conditions.
15. **Regulate groundwater extraction** so that groundwater supplies are sustainable and damage is not caused through over extraction in any given season.
16. **Require Ag to pay true water opportunity costs.** Require agriculture to pay opportunity costs of the water it uses.
17. **Establish Public Trust flows.** Use the public trust doctrine to establish optimal minimum stream flows in all streams in the Sacramento watershed.
18. **Create a clearinghouse for water transfer notifications and information.**
19. **Implement an environmental checklist** for water transfers.
20. **Require water transfer fees to fund a Valley computer model.** Water transfer fees should pay for a publicly owned, computer model on surface and groundwater levels and sustainable use.

D. Barriers to Fish Passage. *Barriers such as dams and weirs do not harm the migratory movements of native species.*

1. **Solve Red Bluff Diversion Dam problems.** Find a workable alternative to the Red Bluff Diversion dam problems.
2. **Help Battle Creek become restoration model.** Use a variety of strategies to ensure that Battle Creek becomes a model for improved fishery passage and restoration.
3. **Evaluate dam removal and fish ladder opportunities.** Create strategic plans for each dam the environmental community prioritizes for removal or construction of adequate fish ladders. (E.g. Remove Daguerre Dam from the Yuba River. Find a route for fish around Englebright Dam or remove or "flow-through" the dam.)
4. **Require water users to fund evaluation and monitoring.** Ensure that local water users pay for dam evaluation, monitoring and modification to benefit fish passage (and instream flow and water quality needs).

E. Grazing Reform. *Livestock Grazing does not harm terrestrial or aquatic habitat.*

1. **Buyout grazing permits.** Join the national movement to buy out public land grazing permits.
2. **Use the Clean Water Act.** Use TMDL provisions in the Clean Water Act to gain set back fencing and other water quality-related, grazing improvements.
3. **Buy easements.** Purchase easements on land with grazing problems and ensure proper management.
4. **Gain better access to information.** Improve access to and quality of current and historic grazing related-information.
5. **Research grazing management practices.** Conduct more research to improve grazing management including how grazing can be integrated into restoration strategies.
6. **Require ranchers pay for monitoring.** Require that ranchers help pay for the monitoring needed to ensure their management practices are not causing downstream water quality and habitat problems.
7. **Pass new legislation.** Determine the best way to use the Democratic majority in the California legislature to pass legislation that will decrease the harm grazing has on habitat.
8. **Increase grazing use fees** to reflect true cost of grazing

F. Habitat Restoration. *The riparian-wetland-aquatic habitats along watercourses and upland habitat throughout the watersheds are of sufficient size and their interactions function naturally so that associated food supplies and other conditions for healthy aquatic and terrestrial species are created and maintained.*

1. **Pursue legal action on county level.** Use legal action to counter local county efforts that make it more difficult to convert land to habitat.
2. **Develop local grassroots pressure.** Build grassroots pressure on county elected officials to make it easier to convert land to habitat.
3. **Implement Wildlife Friendly Farming practices.** Develop the science and grassroots support for Wildlife Friendly Farming practices.

4. **Leverage flood control improvements.** Leverage the need for flood control improvements to increase riparian habitat and meander zones. (E.g. Set back levees along the Yuba and Bear River. Create a meander zone along the Sacramento River that floods on a regular basis.)
5. **Improve the next bond act.** Include funding in the next state water or park bond or environmental fee initiative/legislation in order to provide funding for regional habitat restoration needs including: environmental review, permit fees, invasive species eradication programs, easements, land purchases, monitoring and research, environmental involvement in watershed TACs, regional permit centers, and more.
6. **Mitigate development.** Require mitigation for urban development goes to wildlife restoration and conservation priorities. (E.g. Davis, CA has a 2:1 mitigation requirement for each acre developed but there is no guarantee that the land mitigates habitat loss.)
7. **Identify habitat needs.** Develop the research and computer modeling to identify sustainable habitat needs for all native species including wildlife corridors. Use information to shape Natural Communities Conservation plans (NCCP), Habitat Conservation Plans (HCP) and other large scale species protection and restoration plans in the watershed.
8. **Fund property taxes on habitat conversions.** Find funding for property tax payments on land permanently converted to habitat (e.g. bond acts, environmental fee initiatives, or other legislation).
9. **Allow CEQA exemption for small restoration projects.** Enact a categorical exemption under the California Environmental Quality Act for small restoration projects.
10. **Support CA EPA's Strategic Watershed Plan.** Support and be involved with the State EPA and Resource Agency's Strategic Watershed Plan.
11. **Create model county ordinances.** Work with the California State Association of Counties to create a model county ordinance that the environmental community can support.
12. **Craft a Safe Harbor Program.** Craft a Safe Harbor Program where landowners who restore land will not be a risk for incidental take of endangered species. Ensure that it will truly work for endangered and threatened species and landowners by working in conjunction with CALFED, CDFA and others.
13. **Improve information access and quality.** Improve access to and quality of existing environmental and habitat information.
14. **Research to improve restoration management.** Conduct more scientific research to improve restoration management plans.
15. **Increase public recreational access** Make public access part of habitat restoration projects
16. **Make ESA recovery plans work.** Use the ESA requirement that endangered and listed species recover to sustainable populations as a goal that guides all restoration and planning efforts.
17. **Improve connectivity between habitat sites.** Make connectivity and reduction of fragmentation a priority.

G. Forest Practices. *Forestry practices by private, state, federal and other land owners does not harm terrestrial or downstream aquatic habitat.*

1. **Improve the State Board of Forestry.** Gain a solid environmental majority on the State Board of Forestry either by appointments through the existing process or by changing the legal structure of the Board.

2. **Fully use the Clean Water Act.** Use the Clean Water Act to increase monitoring and force changes in upstream timber operations and road building.
3. **Improve fire fighting policies and regulations.** Improve state and federal fire fighting policies and regulations including prescription burns, let burn policies, and community protection.)
4. **Increase monitoring and research.** Fund more monitoring and research to provide a better legal basis for enforcing the Endangered Species Act, Clean Water Act and other laws on timber operations.
5. **Improve information access and quality.** For example historic timber harvest plans and other information are important to assessing cumulative impacts of new logging plans.
6. **Research to improve management.** Increase funding for research into fire prevention and suppression, road building, different harvest practices and other forest management practices.
8. **Stop the Bush Administration's policies.** Stop the Bush administration rollback of federal forest protection

H. Habitat Protection. *Healthy, remaining wild populations of the species and their habitats are protected.*

1. **Gain Wild and Scenic designation.** Win state or federal Wild and Scenic protection for the streams and rivers throughout the Sacramento watershed.
2. **Increase National Wilderness areas.** Work with Senator Boxer to pass legislation to protect eligible areas in the watershed.
3. **Use easements and purchases.** Use past and future bond acts and other financial resources to purchase outright or buy easements to protect intact habitat.
4. **Designate critical habitat areas,** through court cases if necessarily with clear definitions of what areas must be protected and the standard of protection
5. **Stop new dams.** Stop the expansion of Shasta Dam and the construction of Sites Reservoir and other habitat destroying water supply projects.
6. **Research species sustainability.** Conduct research to better understand the importance of wilderness, wild areas, predators and other factors on species sustainability.
7. **Advance HCPs and NCCPs.** Work with local governments to ensure scientifically sound Habitat Conservation Plans (HCP) and Natural Community Conservation Plans (NCCP) are created and become effective tools for protecting important habitat in their regions.
8. **Fund ESA efforts.** Fund Agencies for ESA listing, enforcement, and recovery
9. **Expand Sacramento River National Wildlife Refuges** and other refuges.

I. Hatcheries. *Hatcheries and their products do not harm aquatic species including wild populations of the fishery that they are producing, native amphibians or other species.*

1. **Improve Coleman National Fish Hatchery.** Improve the operations and strategies of the Coleman National Fish Hatchery.
2. **Change Dept. of Fish and Game trout planting practices** that harm mountain lakes and streams.

3. **Improve regulation of hatcheries.** Better regulate private and other government hatcheries throughout the watershed.
4. **Increase information access.** Improve access to and quality of current and historic hatchery information.
5. **Research hatchery practices.** Conduct more research to increase effectiveness of management practices and lessen negative impacts of hatcheries.
6. **Phase out non-native fish species.** Throughout the watershed, phase out and eliminate the production of hatchery bred, non-native species and the selection process in hatcheries that skews species populations and move towards the use of hatcheries as a tool for recovery.

J. Invasive Species and Diseases. *Invasive and non-native species and diseases do not compete with nor harm any life stage of native aquatic or terrestrial plant or animal species.*

1. **Change grazing and forest practices for weed control.** Change logging and grazing practices and regulations to that cattle management does not spread harmful weeds but assists in their control.
2. **Stop Sudden Oak Death.** Develop and implement an effective plan that prevents the spread of Sudden Oak Death to the Sacramento watershed.
3. **Control Northern Pike.** Solve the problem of Northern Pike at Davis Lake.
4. **Create a united plan for weed management.** Work with agricultural stakeholders and related agencies to create a united plan to reduce and resolve farm related weed infestation and spread.
5. **Eradicate Giant Reed (Arundo) and Tamarisk.** Develop and implement a plan to eradicate Giant Reed and Tamarisk from streams and waterways.
6. **Improve fire management.** Manage fires to improve weed control.
7. **Gain better access to information.** Improve access to and quality of current and historic weed, disease and pest information.
8. **Increase research.** Conduct more research to understand how to better manage land to decrease and prevent weed and invasive species problems.
9. **Reduce feral and nonnative species control and reduce the impacts of feral species.**
10. **Promote weed-free feed.** Promote weed free feed for horses etc.
11. **Reduce impacts of recreation and roads on spread of weeds**

K. Geomorphic Processes. *Geomorphic processes of floods and erosion function so that streams and floodplains renew themselves in a natural way.*

1. **Establish meander zones** so that streams and rivers can erode and deposit sediment and create appropriate habitat.
2. **Create management plans** for each stream and river so that bank full flows and regular flooding supports riparian habitat management.
3. **Add gravel below dams.** Add gravel of the appropriate size, origin and characteristics to enhance spawning grounds and geomorphic processes
4. **Remove or allow water to flow through key dams** (e.g. Englebright, Battle Creek Dams) so that natural movements of sediment and flow occur downstream.

5. **Remove and prevent riprap and bank hardening.** Remove existing and prevent new riprap and other bank hardening projects so that the rivers and streams can meander naturally.
6. **Enhance woody debris for geomorphic benefits.** Leave adequate sizes and amount of woody debris in the river and stream.
7. **Improve information access.** Improve access to and quality of current and historic geomorphic related information.
8. **Increase research.** Conduct more research to improve our understanding of how to manage land, stream restoration and dam management to get the most benefits and least damages from floods, sediment movement and other forces.
9. **Develop geomorphic computer models.** Develop publicly accessible computer models to evaluate setback levees, floodplain levee removal, bank unhardening, meander zones and other restoration efforts that would improve geomorphic processes. Modeling should evaluate potential impacts on flood control and management as well as restoration benefits.
10. **Ensure that mining doesn't harm streams.** Regulate mining so that aggregate so that it doesn't harm streams.

L. Stewardship and Advocacy *In every subwatershed of the Sacramento River, young people and adults learn the biology and science of streams, groundwater, species and habitat and become committed stewards of and advocates for habitat and watershed restoration.*

1. **Improve school curriculum.** Include curriculum in schools that integrates restoration of local habitat into science, math, art, English and other subjects from kindergarten through 12th grade. (E.g. Adopt a Watershed).
2. **Enhance extracurricular programs.** Expand programs that provide young people and adults with opportunities outside of school to learn about the biology and science of restoration while having hands on opportunities to help restore habitat. (e.g. Streamminders)
3. **Help recreation lead to advocacy.** Provide opportunities for local people to recreate in love their local watersheds. Tap this energy by bringing these people into advocacy organizations. (e.g. Friends of the River).
4. **Support non-school learning institutions.** Support educational centers, museums and other learning institutions that help link the cause of environmental damage to actions that can help in restoration and prevention. (e.g. Discovery Center)
5. **Create advocacy training.** Provide training opportunities for environmentally concerned citizens to learn how the governmental decision making system works and how they can help make a difference by making the most of their energy, skills and affinities.
6. **Improve effectiveness of environmental groups.** Improve the leadership, organizing and fundraising skills of local environmental organizations throughout the watershed so that they can more effectively recruit and utilize the energy of their volunteers.
7. **Elect environmental candidates.** Recruit, train, and help in campaigns of environmentally supportive candidates.
8. **Improve media coverage** of environmental issues
9. **Educate consumers** - about the impacts of agriculture and forestry and the impacts of their consumer decisions on these areas/

M. Urban Growth. *Cities and towns throughout the region use "smart growth" principles, mitigation fees and other tools to minimize expansion onto prime agricultural and habitat lands, reduce overall air and water pollution, and protect open space and habitat.*

1. **Increase densification and stop sprawl.** Change state laws to make it easier to increase densification and penalize sprawl.
2. **Elect green city council members and county supervisors.** Create Political Action Committees and organize volunteers to help elected environmental positive candidates for local offices.
3. **Establish mitigation fees.** Require a minimum habitat mitigation fee for every acre of new development. Pass state legislation or an initiative if it is impossible to pass this locally.
4. **Require sustainable water supplies for new growth.** Require that all new development of 50 homes or more identify a long term sustainable source of water. (Existing law is limited to 500 homes or more.)
5. **Improve urban forests.** Improve urban forest practices in local cities so that trees and landscaping in towns can benefit species.
6. **Elect state and national environmental candidates.** Recruit, train, and help in campaigns of candidates that will enact habitat friendly policies and laws at the state and national levels.
7. **Create and support land use conservation initiatives** on a local and state wide basis.
8. **Provide recreation opportunities.** Provide adequate recreation opportunities for the public.
9. **Fight takings initiatives.** Work at a local and state level to stop efforts to enact "takings" laws that harm habitat and environmental quality.
10. **Protect groundwater recharge areas.** Identify places where groundwater recharges and protect them from pavement and other development that reduces recharge.
11. **Stop subsidizing growth.** Identify all the ways in which local, state and federal governments subsidize development. Prioritize the worst subsidies and create campaigns to end them.

N. Knowledge. *The public and decision makers have the monitoring, research, conceptual models, computer models, historic information, peer review, economic analysis and public input necessary to make decisions that benefit long term habitat health.*

1. **Improve access to information.** Pass state legislation that requires all publicly funded research and other related information be placed on the web upon completion. At least publish the metadata in an online database so that the public can read the Executive Summary and know where to find the original material.
2. **Create watershed web portals.** Work with stakeholders to develop watershed web portals from which one can find all public information important to habitat in that watershed.
3. **Conduct monitoring.** Create sustainable, scientifically sound and comprehensive monitoring programs for water quality, species, and other environmental parameters so that important data can be produced for years to come.
4. **Access historic information.** Develop funds (e.g. CALFED and Prop. 50 grants, Budget Amendments) so that local state and federal agencies can find, digitize and place on line important historic environmental datasets, documents, aerial photographs and other information. Pursue the

use of interns to help in this work. Use a web metadata database to provide access to the information.

5. **Access aerial photographs.** Identify and make accessible current and historic aerial photographs and produce new aerial photographs to meet important habitat management and evaluation information needs. Ensure high quality, orthorectified photos are available for the entire watershed.

6. **Develop watershed computer models.** Develop public domain computer models for all subwatersheds that flow into the Sacramento River. These computer models would be usable by all stakeholder groups. Assumptions and datasets can be changed in them. Water quality, water supply, groundwater use, habitat, flood management and other environmental attributes can be evaluated and new management scenarios predicted.

7. **Protect whistleblowers.** State and federal agency staff are protected through whistleblower and other laws so that they can freely express their knowledge and opinions without fear of retribution.

8. **Utilize grad students.** PhD, Masters and university students are encouraged and supported to do their thesis on real world problems that will benefit habitat restoration.

9. **Clarify conceptual models.** All areas of habitat restoration goals (e.g. water quality, stream flows, habitat restoration etc) should have publicly develop conceptual models that use the best available science to craft hypotheses and subhypotheses upon which adaptive management plans are created and implemented.

O. Stabilize Population and Consumption of Resources

1. **Link sustainability to growth.** Link sustainability discussions to population growth

2. **Fund international family planning**

3. **Stop subsidizing growth.**