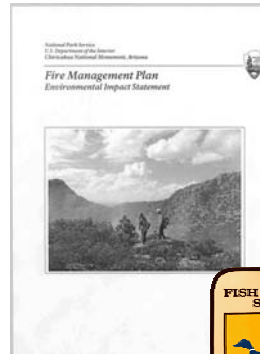


Lecture 11, 25 Sept 2007

Legislation
Paradigms

Conservation Biology
ECOL 406R/506R
University of Arizona
Fall 2007

Kevin Bonine
Cathy Hulshof



Upcoming Readings

today: [Text Ch. 2](#); [ESA & NEPA links](#); [Text Ch5?](#)

Thurs 27 Sept: Exam 1

Tues 02 Oct: [Text 230-248](#); and see website

Thanks to Brian Powell
Q3 due 09 Oct if you choose

1

Conservation Biology Lab 406L/506L

Friday 1230 -> Sunday sunset

Meet 1230h S or W side BSE (4th and
Highland)

Hat, water, sunscreen, close-toed shoes
Lunch, snacks, weather gear, (\$?)

Add camping gear and food!

Readings on Course Website:

[Las Cienegas, Ranching, San Pedro](#)



The Las Cienegas NCA includes a variety of unique and rare vegetative communities including **five** of the rarest habitat types in the American Southwest: [cienegas \(marshlands\)](#), [cottonwood-willow riparian forests](#), [sacaton grasslands](#), [mesquite bosques](#), and [semi-desert grasslands](#).

2

Debate 20 Sept 2007:
Should the flat-tailed horned lizard (*Phrynosoma mcallii*) be ESA listed?

Three groups – one will debate, another will evaluate, third will observe, then we rotate.

406	Debate 1 (20 Sept.)	Debate 1 (20 Sept.)
	Group A debate	506 A assist
	Group B evaluate	506 B assist
	Group C observe	506 C observe
	Debate 2 (23 Oct.)	Debate 2 (23 Oct.)
	Group A observe	506 A observe
	Group B debate	506 B assist
	Group C evaluate	506 C assist
	Debate 3 (15 Nov.)	Debate 3 (15 Nov.)
	Group A evaluate	506 A assist
	Group B observe	506 B observe
	Group C debate	506 C assist

3

Short paper suggestions:

Choose a thesis to support and state it upfront, then defend it.

A catchy title.

Name, Date, One Page, Double Space

Best papers supported their arguments with one or two other sources. Use citation format of Conservation Biology articles.

Review Essay and Paragraph structural suggestions.

Proofread.


4



5

Date: August 14, 2006

To: The Honorable Chairman and Members
Pima County Board of Supervisors

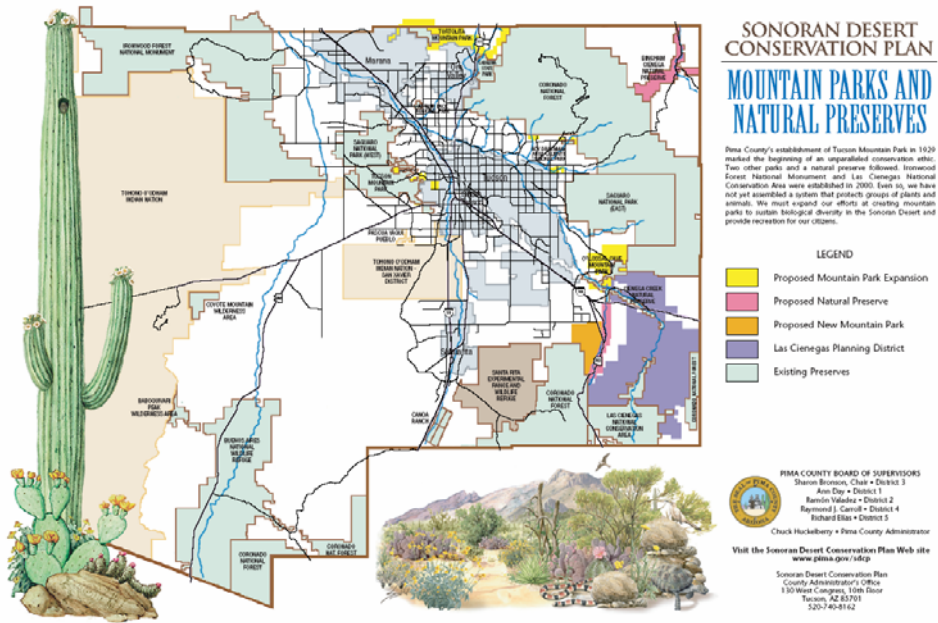
From: C.H. Huckelberry
County Administrator 

Re: Draft Multi-Species Conservation Plan

Introduction

Attached is the draft Multi-Species Conservation Plan that Pima County will submit to the United States Fish and Wildlife Service for a Section 10 permit. The permit package will also contain the Environmental Impact Statement, which belongs to the Service, and an Implementation Agreement that delineates obligations in a phased approach. Earlier drafts of the Multi-Species Conservation Plan have been published in 2003, 2005, and in January of 2006 as part of the extensive process of developing scientific information and inviting public review and comment.

6



7

Biological Basis of the Sonoran Desert Conservation Plan



Thanks to Bob Steidl and others...

8

SDCP Biological Goal

Ensure the long-term survival of the full spectrum of plants and animals that are indigenous to Pima County...



9

Approach

- Select elements for planning
- Establish quantifiable goals
- Develop explicit rules for reserve design process
- Organize, synthesize, and acquire information
- Evaluate
- Establish, Monitor, Manage



10

Select Species

- Regionally “vulnerable” species
- Short-list of 55 species

Species chosen should have little influence on ultimate reserve design



11

Species List

- 9 mammals
- 8 birds
- 7 reptiles
- 2 frogs
- 6 fish
- 16 invertebrates
- 7 plants
- 7 bats
- 6 riparian
- 3 riparian
- all riparian
- all riparian
- mostly snails
- 2 riparian

>60% of plants and vertebrates associated with
riparian environments

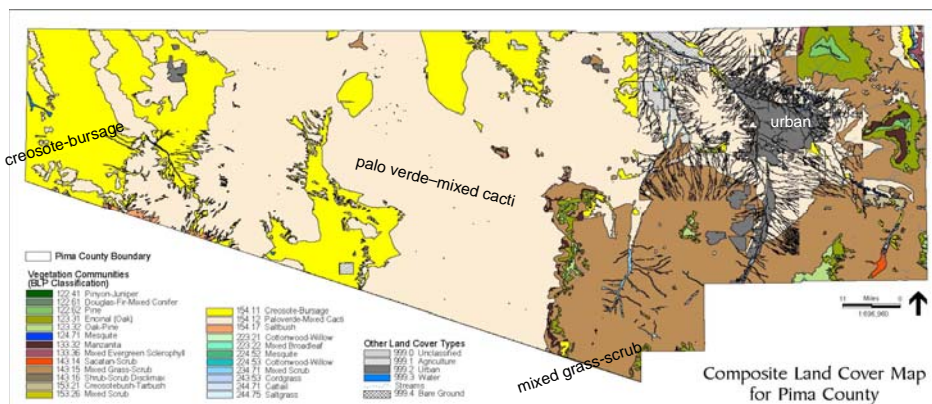
12

Species Information

- Natural history accounts
- Species-environment matrix
- Decide best method by which to achieve goals for each species
- Less helpful if:
 - either rare or common
 - on lands that are protected or off-limits
 - limited natural-history information
- Reduced from 55 to 44 species

13

Land Cover



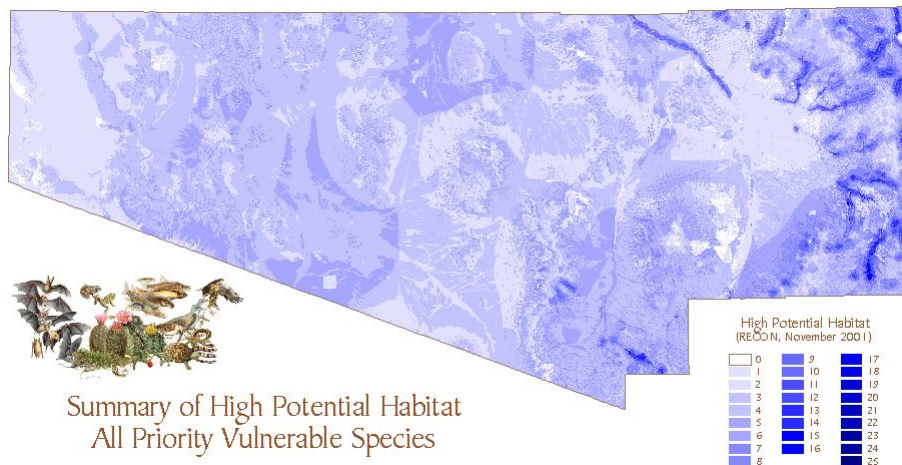
14

Species Distributions

- Based on **models** rather than known locations or published distributions
- Developed to **predict species distributions based on potential habitat**
- Input and evaluation by **experts**
 - Habitat associations, known distribution
- Iterate
- **Combine to identify areas of high species richness**

15

Species Richness, 1 or more



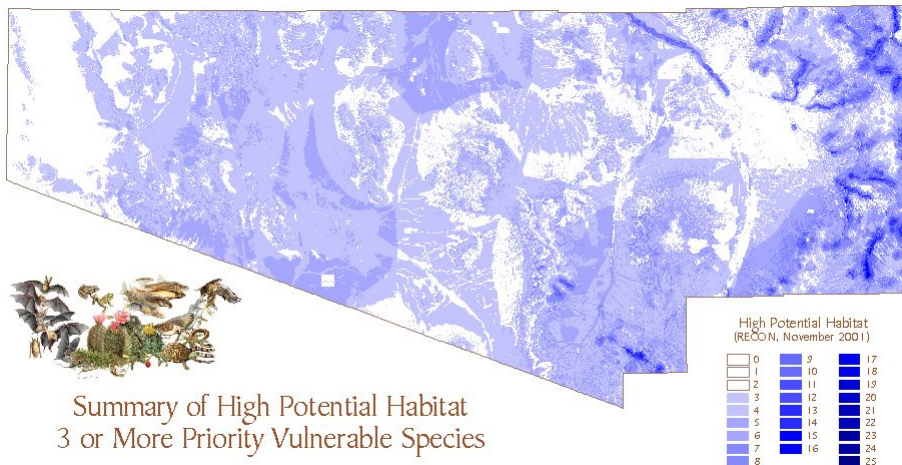
16

Species Richness, 2 or more



17

Species Richness, 3 or more



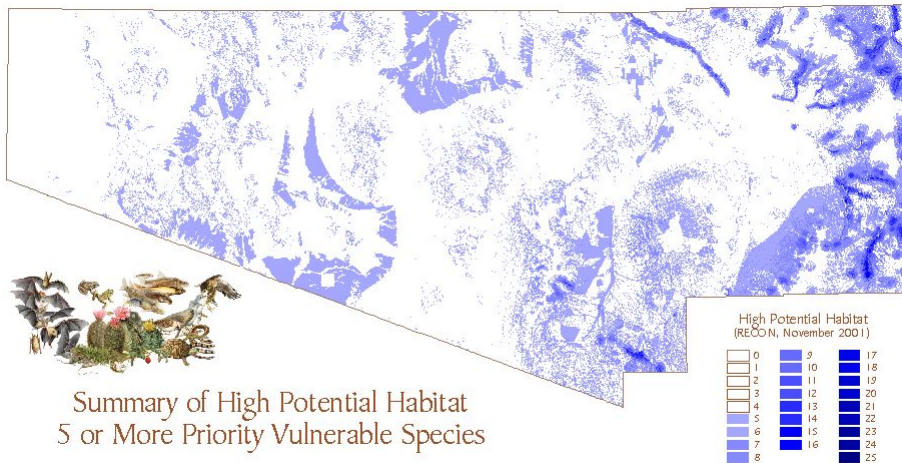
18

Species Richness, 4 or more



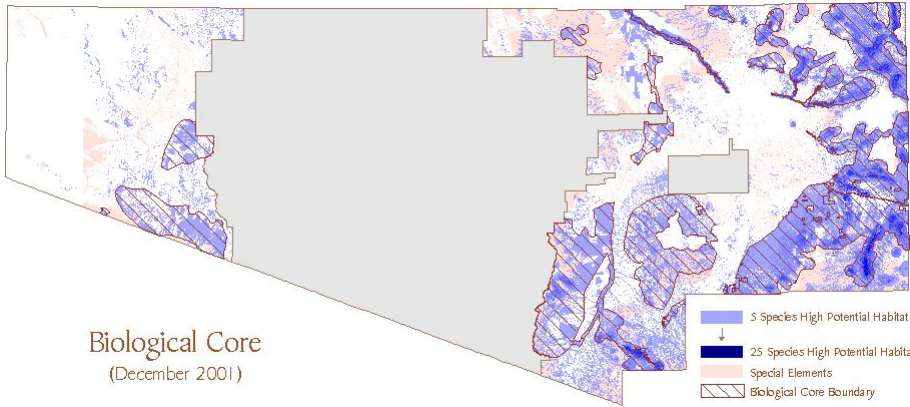
19

Species Richness, 5 or more

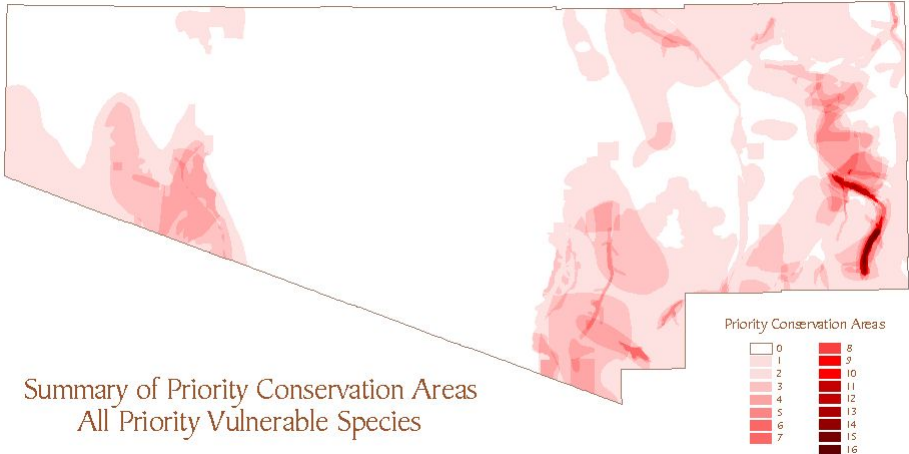


20

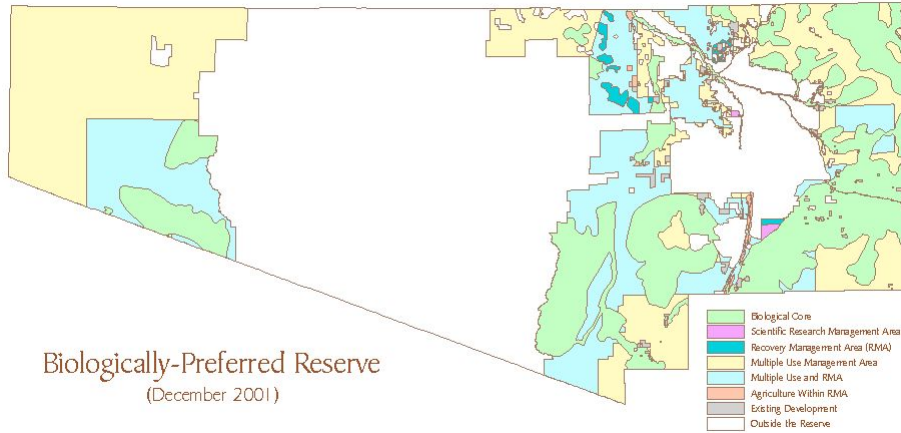
Biological Core



Species Richness – Expert Opinion

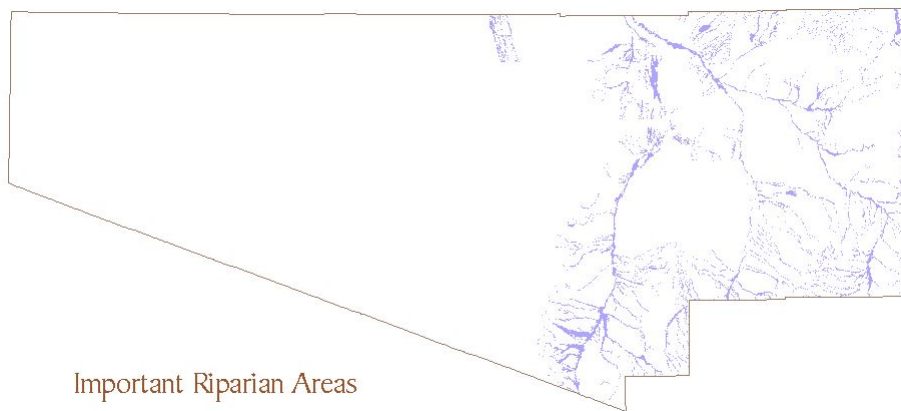


Biologically Preferred

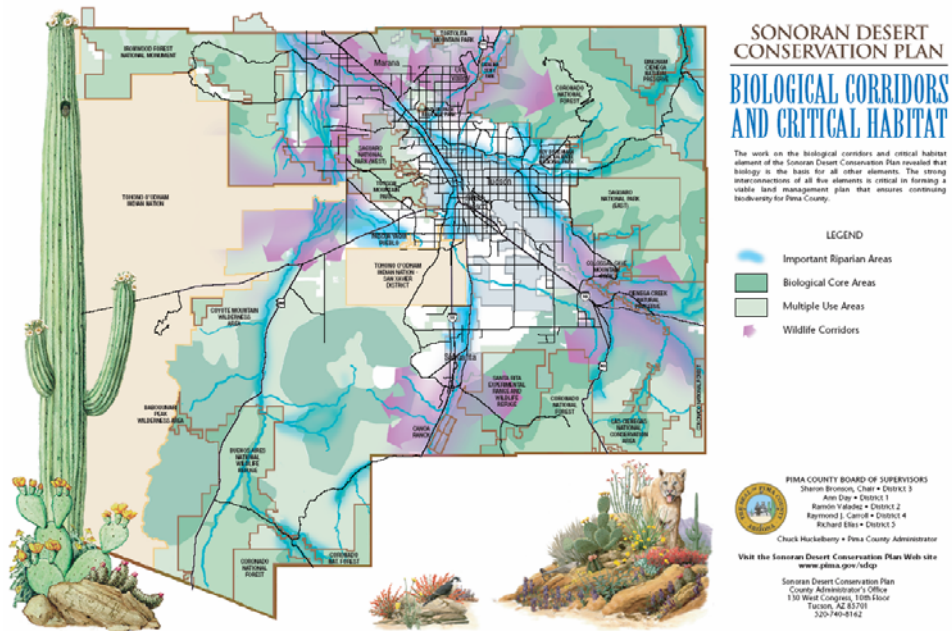


23

Riparian as Foundation for Linkages



24



25

Brian Powell

- Inventory
- Monitoring
- Adaptive Management

Biological Integrity: Flora and Fauna

[Exotic Plants - Early Detection](#)
[Exotic Plants - Status and Trends](#)
[Phenology](#)
[Vegetation Life Form Abundance](#)
[Vegetation Community Structure](#)
[Bird Community Dynamics](#)
[Fish Community Dynamics](#)
[\(Specific Species Monitoring\)](#)

Landscape Pattern and Processes and Human Use

[Illegal Roads and Trails](#)
[Visitor Impacts](#)
[Visitor Use](#)
[Landscape Dynamics](#)
[\(Fire and Fuel Dynamics\)](#)
[\(Net Primary Productivity\)](#)

List of Vital Signs

Vital Signs in (parentheses) are not currently monitored by SODN, but may be monitored by individual Parks or other agencies.

Air Quality and Climate

[\(Ozone\)](#)
[Wet and Dry Deposition](#)
[Visibility and Particulate Matter](#)
[\(Broad-Scale Climate\)](#)
[Meso-Scale Climate](#)

Geology and Soils

[Channel Morphology](#)
[\(Upland Soil Movement\)](#)
[Biological Soil Crusts](#)
[Soil Aggregate Stability](#)
[Soil Compaction](#)
[Soil Cover](#)
[\(Soil Organic Matter Content\)](#)
[\(Soil Carbon and Nitrogen Content\)](#)

Water Quality and Quantity

[Groundwater Dynamics](#)
[Surface Water Dynamics](#)
[Core Water Quality Parameters](#)
[Nutrient Loading](#)
[Pollutant Metals](#)
[Microorganisms](#)
[Aquatic Macroinvertebrates and Algae](#)
[\(Carcinogens and Toxins\)](#)
[\(Suspended Sediments\)](#)

26

NEPA, NEPA, NEPA!!!!



An EIS includes...

- Project goals and objectives
- Resources that might be affected
- Alternative ways to try to achieve the goals
- Environmental impacts that are likely to occur under each alternative
- Potential mitigation



The public gets to review the EIS and make comments.

The agency has to take these comments into account before deciding upon an alternative.

29

Summary

- The EIS is supposed to help agencies decide how they can achieve their goals, taking all environmental impacts into account, with input from the people who are going to be affected (the public).

30

The National Environmental Policy Act of 1969, as amended
(Pub. L. 91-190, 42 U.S.C. 4321-4347, January 1, 1970, as amended by Pub. L. 94-52, July 3, 1975, Pub. L. 94-63, August 9, 1975, and Pub. L. 97-258, § 4(b), Sept. 13, 1982)

An Act to establish a national policy for the environment, to provide for the establishment of a Council on Environmental Quality, and for other purposes.

As amended by the Senate and House of Representatives of the United States of America in Congress assembled. That this Act may be cited as the "National Environmental Policy Act of 1969."

Purpose

Sec. 2 [42 USC § 4321].

The purposes of this Act are: To declare a national policy which will encourage productive and enjoyable harmony between man and his environment; to promote efforts which will prevent or eliminate damage to the environment and biosphere and stimulate the health and welfare of man; to enrich the understanding of the ecological systems and natural resources important to the Nation; and to establish a Council on Environmental Quality.

TITLE I

CONGRESSIONAL DECLARATION OF NATIONAL ENVIRONMENTAL POLICY

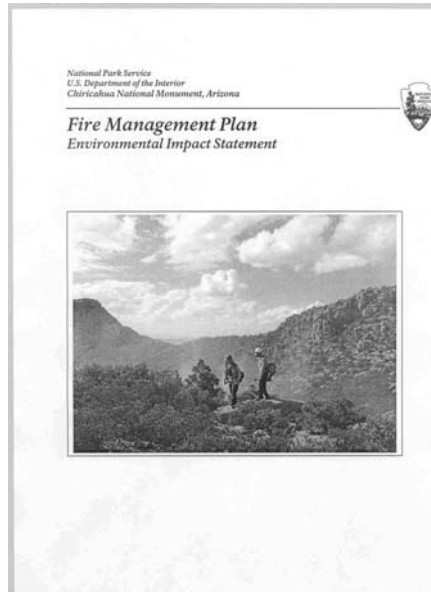
Sec. 101 [42 USC § 4331].

(a) The Congress, recognizing the profound impact of man's activity on the interrelations of all components of the natural environment, particularly the profound influences of population growth, high-density urbanization, industrial expansion, resource depletion, and land and equating technological advances and recognizing further the critical importance of restoring and maintaining environmental quality to the overall welfare and development of man, declares that it is the continuing policy of the Federal Government, in cooperation with State and local governments, and other concerned public and private organizations, to use all practicable means and measures, including financial and technical assistance, in a manner calculated to foster and promote the general welfare, to create and maintain conditions under which man and nature can exist in productive harmony, and fulfill the social, economic, and other requirements of present and future generations of Americans.

(b) In order to carry out the policy set forth in this Act, it is the continuing responsibility of the Federal Government to use all practicable means, consistent with other essential considerations of national policy, to improve and coordinate Federal plans, functions, programs, and resources to the end that the Nation may --

1. fulfill the responsibilities of each generation as trustee of the environment for succeeding generations;
2. assure for all Americans safe, healthful, productive, and aesthetically and culturally pleasing surroundings;
3. attain the widest range of beneficial uses of the environment without degradation, risk to health or safety, or other undesirable and unintended consequences;
4. preserve important historic, cultural, and natural aspects of our national heritage, and maintain, wherever possible, an environment which supports diversity, and variety of individual choice;
5. achieve a balance between population and resource use which will permit high standards of living and a wide sharing of life's amenities; and

NEPA: 3 pages



EIS: 175 pages

31

EIS drawbacks?

- The EIS is supposed to help agencies decide how they can achieve their goals, taking all environmental impacts into account, with input from the people who are going to be affected (the public).

32

Fujicolor Processing Pleads Guilty to Environmental Crime

Release date: 09/06/2007

Contact Information: Roxanne Smith, (202) 564-4355 / smith.roxanne@epa.gov

(Washington, D.C. - Sept. 6, 2007) Fujicolor Processing agreed to pay a \$200,000 criminal fine for discharging excessive amounts of silver-tainted photo processing waste to a Texas wastewater treatment plant, the Justice Department and Environmental Protection Agency announced today.

Fujicolor pleaded guilty to one count of negligently violating a requirement of its pretreatment permit at its photo-processing facility in Terrell, Texas.

Based on an internal investigation, Fujicolor discovered that from 1999 through July 2002 employees were selectively reporting to the city only test results that fell within permit limits. Industrial facilities report results to local agencies for permit compliance purposes. **Employees would send part of a sample to a laboratory for screening and, if the sample met permit limits, it would be submitted to the city. If a sample did not meet the silver limit, employees would keep collecting samples until they found one that fell within allowable limits.** Fujicolor discovered similar problems at its facilities in New Britain, Conn., and Tukwila, Wash.

"By 'cherry-picking' samples, Fuji's employees undermined federal and state permit programs," said Granta Nakayama, assistant administrator for the EPA's enforcement and compliance assurance program.

EPA requires that industry pre-treat toxic pollutants chemicals in their wastes in order to protect local sewers and wastewater treatment plants. Local agencies must regulate industrial facilities by issuing permits, conducting inspections, sampling wastewater and reviewing each facility's monitoring data.

In July 2002, the city of Terrell fined the facility \$105,725 for exceeding its monthly limit for silver, based on samples submitted by the facility.

Fujicolor disclosed the findings of its investigation to federal and local officials. The company has since taken action to address the environmental problems, including firing employees responsible for violations and putting safeguards in place to prevent additional violations.

This investigation was conducted by the EPA's Criminal Investigations Division, and the Texas Department of Environmental Quality. The case was prosecuted by the U.S. Department of Justice Environmental Crimes Section and the U.S. Attorneys Office for the Northern District of Texas.

33

ESA

The endangered species program

<http://www.fws.gov/endangered/>

"Taking"

Shoot, Shovel, Shut Up

Led to **Habitat Conservation Planning (HCP)**

Incidental Take Permits (e.g., SDCP with mitigation)

San Bruno Mtns

-negotiate, compromise, all parties involved

"No Surprises"

MOAs

Safe Harbor Agreements

Need to
include and
motivate
private
landowners

34

Pre- Endangered Species Act of 1973 Legislation

- ***Lacey Act*** - 1900. Authorized Federal enforcement of state wildlife laws and based on Federal power to regulate interstate commerce.
- ***Committee on Rare and Endangered Wildlife Species 1964*** - consists of 9 biologist - published the first “Redbook” - first Federal list of fish and wildlife considered threatened with extinction.



Pre- Endangered Species Act of 1973 Legislation

- ***Lacey Act*** - 1900.
- ***Committee on Rare and Endangered Wildlife Species 1964***
- ***1966 Endangered Species Preservation Act*** - Federal agencies must conserve habitats of native vertebrate species found by the Secretary of the Interior to be in danger of Extinction to the extent “Practicable and consistent” with the primary purposes of the Federal agencies.



Pre- Endangered Species Act of 1973 Legislation

- **1969 Endangered Species Conservation Act** - extended protection to invertebrates, and extended the Lacey Act's prohibitions to cover **interstate commerce** in illegally taken reptiles, amphibians, and certain invertebrates. Also took **Global View** - authorized Secretary to make a list of species threatened with worldwide extinction and with limited exceptions permitted the Secretary to prohibit imports of such species or their products into the U.S.



Endangered Species Act of 1973, as Amended

- Largest controversy involved whether protection should be extended to **plants**.
- Not seen as a large economic issue. **Passed Senate unanimously, passed House overwhelmingly**
- Signed into law on December 28, 1973



Endangered Species Act of 1973, as Amended

- Jointly administered by Secretaries of Interior and Commerce (**Fish and Wildlife Service** and **National Marine Fisheries Service**)
- **Amended** many times.



Endangered Species Act of 1973, as Amended

- Section 3. Definitions
- **Section 4. Determination of endangered species and threatened species (Listing)**
- Section 5. Land acquisition
- Section 6. Cooperation with States
- **Section 7. Interagency cooperation**
- Section 8. International cooperation
- Section 8A. Convention implementation
- Section 9. Prohibited Acts
- **Section 10. Exceptions**
- Section 11. Penalties and enforcement
- Section 12. Endangered Plants





Thanks to
Paul Barrett
and
Sherry Barrett

41

Section 4, ESA

Listing Species Pursuant to
the Endangered Species Act of
1973, As Amended



5 Listing Factors

1. The present or threatened destruction, modification, or curtailment of its **habitat** or range;
2. **Overutilization** for commercial, recreational, scientific, or educational purposes;
3. **Disease or predation**;
4. The **inadequacy of existing regulatory mechanisms**;
5. **Other natural or manmade factors** affecting its continued existence.



Section 7, ESA

Interagency cooperation



Section 10, ESA

Exceptions

10(a)(1)(A) – Recovery Permits

10(a)(1)(B) - HCP

(SDCP: Multi-species HCP)



Recovery Planning

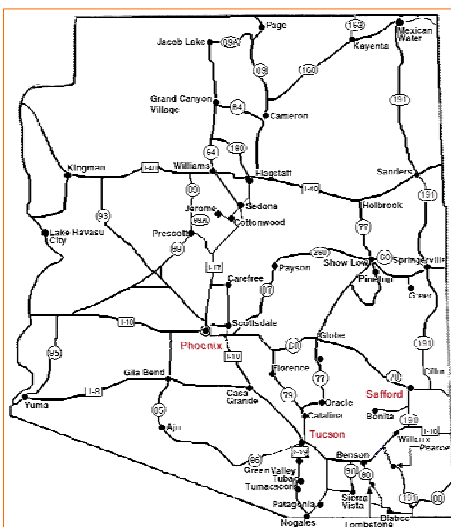


Mount Graham Red Squirrel *Tamiasciurus hudsonicus grahamensis*

- Listed as endangered in 1987



Mount Graham Red Squirrel *Tamiasciurus hudsonicus grahamensis*





49

Mount Graham Red Squirrel *Tamiasciurus hudsonicus grahamensis*

- Restricted to:
 - Spruce-Fir
 - Transition
 - Mixed Conifer
- Above 8000 ft



**Revised Mount Graham Red Squirrel
(*Tamiasciurus hudsonicus grahamensis*) Recovery Plan**

-Technical Subteam

- Squirrel biologists
- Silviculturalist
- Fire Ecologist
- Forest health specialist
- Conservation biologists
- Population biologists
- Entomologists



Revised Mount Graham Red Squirrel (*Tamiasciurus hudsonicus grahamensis*) Recovery Plan

-Implementation Subteam

- Forest Service
- AGFD
- Local Governments
- Steward Observatory
- Local Interests (Summerhome Associations)
- Nongovernmental Organizations
- Native American Tribes



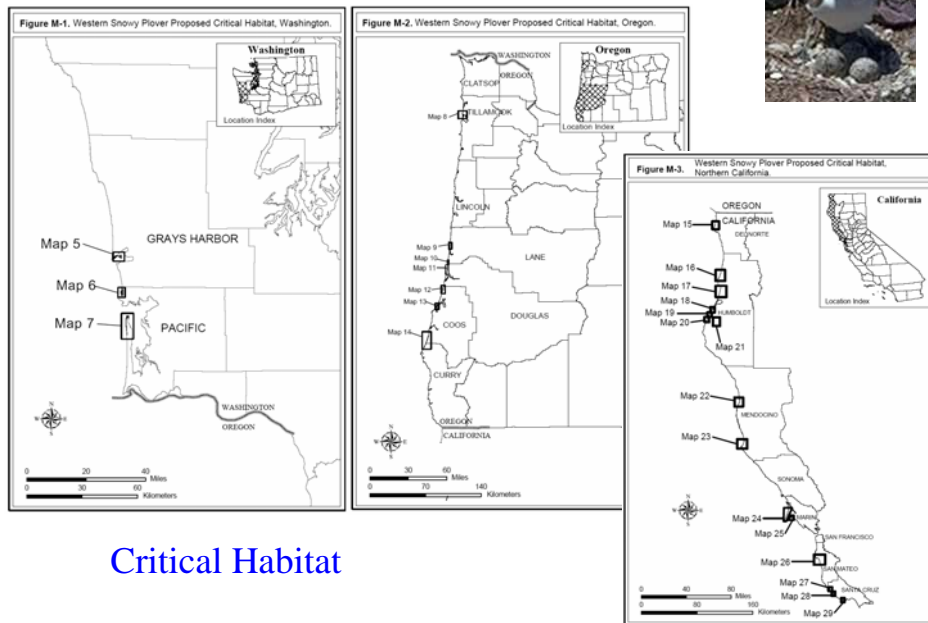
<http://www.delta.dfg.ca.gov/gallery/dsmelt.asp>

California Water Supply Cut by up to a Third To Protect Endangered Fish



Public Water Agencies Assess Impacts of Largest Court-Ordered Water Supply Reduction in California History SACRAMENTO, Calif., Aug. 31, 2007 /PRNewswire-USNewswire/ -- The State Water Contractors, an association of 27 public water agencies in Northern, Central and Southern California, reacted to the largest court-ordered water supply reduction in California history, citing statewide impacts to farms, businesses and people. U.S. District Court Judge Oliver Wanger ordered today a massive reduction in water supplies from the state's two largest water delivery systems, the **State Water Project (SWP)** and Central Valley Project (CVP), **to protect an endangered fish species, the Delta smelt**. While state and local water agencies are still analyzing the court ruling, initial review projects the reduction could be up to one-third (1/3) of the combined SWP/CVP water supplies, or two million acre-feet of water. The two projects funnel water through the **Sacramento-San Joaquin River Delta (Delta)** to **urban and agricultural water users**. The reduction is anticipated to last while federal agencies develop a revised federal biological opinion for Delta smelt that will ensure the projects' **compliance with Endangered Species Act requirements**. "Today's ruling is an unprecedented cutback in our statewide water supply, forcing local water agencies to scramble to identify back up water sources and find ways to lessen direct impacts on their customers," said Laura King Moon. **"Never, in California's history, have we had a court impose such a massive reduction in the water use - and it is not clear that even this extraordinary action will save the Delta smelt given all the other threats to its existence."** Local water agencies will have to rely on contingency and emergency sources of water, including local groundwater and storage supplies, to lessen direct impacts on their customers. However, by doing so, they will exhaust or significantly limit supplies that would be needed for a drought or major catastrophe, such as an earthquake, major flood event, etc. Local agencies are particularly concerned about depleting their back up reserves during the current drought - 2007 is the driest year on record for parts of California. "The cutback considerably increases the chances of severe water use restrictions at the local level - water agencies can only rely on emergency or contingency sources for so long," added Moon. This significant reduction in water supply will be experienced in the Bay Area, Central and Southern California. **The SWP is a critical source of water for the majority of California, providing water to two out of every three people (approximately 25 million residents), irrigating 750,000 acres of prime agricultural lands and directly supporting \$400 million of the state's trillion-dollar economy.** "Farms, businesses and people will all feel the impacts of this ruling," added Moon. "The ripple effects will undoubtedly harm our state economy and cause loss of jobs. The most immediate impact of the court ruling will be in agricultural communities as farmers in the San Joaquin Valley, Inland Empire and San Diego regions are forced to abandon crop planting this coming winter and spring. Urban water users will need to conserve water during this critical time period. In some regions, consumers may be asked for more stringent water restrictions, including rationing, and may experience increased costs. Throughout the coming weeks, local public water agencies will be assessing direct impacts of the court ruling to their regions and customers, including potential impacts on local economic growth. As background, Judge Wanger ruled, in May 2007, that the existing 2005 biological opinion for Delta smelt, issued by the U.S. Fish and Wildlife Agency, did not comply with the Endangered Species Act. The biological opinion guides pumping operations for the CVP and SWP to ensure no long-term jeopardy to the health and habitat of Delta smelt. Until a revised biological opinion is prepared by the federal agencies, Judge Wanger has ordered certain "remedies" or actions to protect the endangered fish species. Those remedies, imposed in today's ruling, collectively amount to the cut in statewide water supply. While the court order will be for one year, these kinds of reductions will likely continue until the Delta system is fixed. "Today's decision comes at a time when the Delta is in dire need of a fix, and the cutbacks ordered by the court only emphasize the instability of the Delta and the need for improvements to the state's broken conveyance system," added Moon. The Delta's failing condition has made it an increasingly unreliable pathway for delivering water to 25 million Californians, businesses and farms throughout the state. Aged and deteriorating levees, climate change, mounting regulatory uncertainties such as this most recent event and a struggling eco-system plague the Delta more so today than ever before. These unprecedented challenges need to be addressed responsibly and in a timely manner in order to avoid immeasurable damages to California's water supply, environment, public health, statewide economy and infrastructure system. The State Water Contractors is a non-profit association of 27 public agencies from Northern, Central and Southern California that purchase water under contract from the California State Water Project. Collectively the State Water Contractors deliver water to more than 25 million residents throughout the state and more than 750,000 acres of agricultural lands. For more information on the State Water Contractors, please visit <http://www.swc.org>.

western snowy plover



Critical Habitat

The [U.S. Fish and Wildlife Service](#) has completed a final rule designating 32 units of critical habitat along the coast of California, Oregon, and Washington for the Pacific coast population of the western snowy plover, a Federally threatened species. The critical habitat units total [12,145 acres, nearly 40 per cent less acreage than an earlier critical habitat plan the Service adopted in 1999.](#)

Of the designated units, 24 are in California (7,472 acres), five are in Oregon (2,147 acres), and three are in Washington (2,526 acres). Of the total acreage, 2,479 acres (20 percent) are on Federal lands; 6,474 acres (53 percent) are owned by states or local agencies; and 3,191 acres (26 percent) are private.

Compared to the 1999 plan, today's action designates more critical habitat units but generally smaller ones, based on increased knowledge of the species' needs and better mapping. This new rule designates 32 units covering 12,145 acres, compared to 28 units covering 19,474 acres in the 1999 plan.

The rule will take effect 30 days after publication.

[Some 2,859 acres of proposed critical habitat in six units were deleted based on the projected cost of designating critical habitat. An economic analysis prepared by Industrial Economics Inc. projected that critical habitat could cost between \\$273 million and \\$645 million, with the biggest costs due to beach recreation losses. More than three-quarters of the loss was found to occur in five proposed California critical habitat units, located on Coronado's Silver Strand, Morro Bay, Pismo Beach, and two on Monterey Bay.](#)

In addition, 615 acres were deleted because of management plans and commitments -- such as Habitat Conservation Plans -- and 1,621 acres were deleted because they are covered by military land management plans or national security needs.

56

http://www.fws.gov/pacific/sacramento/ea/news_releases/2005%20News%20Releases/WSP_fCH2005_NR.htm

ESA

The endangered species program

<http://www.fws.gov/endangered/>

“Taking”

Shoot, Shovel, Shut Up

Led to [Habitat Conservation Planning \(HCP\)](#)

[Incidental Take](#) Permits (e.g., SDCP with mitigation)

San Bruno Mtns

-negotiate, compromise, all parties involved

“No Surprises”

MOAs

Safe Harbor Agreements

Need to
include and
motivate
private
landowners

57

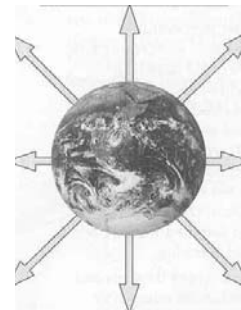
[International Conservation Laws and Treaties](#)

Implementation, Compliance, Effectiveness

Fewer people and larger industry = easier

[Intent](#) and [Capacity](#) to comply

-incentives vs. coercion



58

1937 Whaling

1950 Birds

1958 Benelux (birds)

1973 Baltic Sea



1973 CITES (trade or species?)
Appendix I, II, III

1982 Antarctic Marine Resources

59

CITES:



<http://www.cites.org/> 60

The CITES species

Roughly 5,000 species of animals and 28,000 species of plants are protected by CITES against over-exploitation through international trade. They are listed in the three [CITES Appendices](#). The species are grouped in the Appendices according to how threatened they are by international trade. They include some whole groups, such as primates, cetaceans (whales, dolphins and porpoises), sea turtles, parrots, corals, cacti and orchids. But in some cases only a subspecies or geographically separate population of a species (for example the population of just one country) is listed. The table below shows the approximate numbers of species that are included in the CITES Appendices as of present*.

	Appendix I	Appendix II	Appendix III
Mammals	228 spp. + 21 sspp. + 13 popns	369 spp. + 34 sspp. + 14 popns	57 spp. + 11 sspp.
Birds	146 spp. + 19 sspp. + 2 popns	1401 spp. + 8 sspp. + 1 popn	149 spp.
Reptiles	67 spp. + 3 sspp. + 4 popns	508 spp. + 3 sspp. + 4 popns	25 spp.
Amphibians	16 spp.	90 spp.	-
Fish	9 spp.	68 spp.	-
Invertebrates	63 spp. + 5 sspp.	2030 spp. + 1 ssp.	16 spp.
Plants	298 spp. + 4 sspp.	28074 spp. + 3 sspp. + 6 popns	45 spp. + 1 ssp. + 2 popns
Totals	827 spp. + 52 sspp. + 19 popns	32540 spp. + 49 sspp. + 25 popns	291 spp. + 12 sspp. + 2 popns



Any type of wild plant or animal may be included in the list of species protected by CITES [see Resolution [Conf. 9.24 \(Rev. CoP13\)](#)] and the range of wildlife species included in the Appendices extends from leeches to lions and from pine trees to pitcher plants. While the more charismatic creatures, such as bears and whales, may be the better known examples of CITES species, the most numerous groups include many less popularized plants and animals, such as aloe, corals, mussels and frogs.

http://www.cites.org/gallery/species/index.html

61

Habitats and Ecosystems...

1971 Ramsar Wetlands (Iran)

119 countries

500 listed wetlands

1972 UN (UNEP)

United Nations Environmental Program

-include social issues

62

1992 Earth Summit (aka Rio Summit)

-Agenda 21

(environment, social issues, poverty, technology transfer, sustainability, water, pollution)

- 178 Governments
- Developed countries aid developing
- Sustainable Development
- Polluter Pays

- Convention on Global Warming
- Convention on Biodiversity

33

1972 US Marine Mammal Protection Act

dolphins
tuna
international trade

1989 US Sea Turtle Act

shrimp
TED's
international trade
GATT (general agreement on tariffs and free trade)

Unilateral vs. cooperative?

- WTO - trade over environment
- Leadership vs. Imperialism

64