After The Invasion:

The Hope of Ecological Restoration

Removing the unwanted can be disturbing and socially painful.

It is a creative destruction with an understanding that it will nurture a healthier or more supportive future.

Each human community must ultimately work out its own limits to acceptable change and how best to existentially re-connection its people to their bioregion, landscape and place.

Since Columbus, the invader, more than 30,000 species of imported plants, animals, and microbes have made their homes in North America.

They cost the US more than $138 billion each year (2000 dollars)

Weeds	**$35 billion**
Insects	**$20 billion**
Human-Disease Organisms	**$6.5 billion**

Life Out of Bounds, Chris Bright

The Unwanted:
A Value Decision

Aggressive spreaders

Evade, resist and out-compete native species

Imports, native irruptions, bio-engineered escapees

HUMANS
AND THEIR ANIMALS
HAVE BEEN THE
PRIMARY CAUSAL AGENTS
DIRECTLY RESPONSIBLE FOR
LOSS OF BIODIVERSITY,
ECOLOGICAL DEGRADATION
AND NON-NATIVE, INVASIVE
SPECIES PROLIFERATION AND
SPREAD

THE FUTURE IS HERE !

WE ARE IT

If our collective social and political value is to sustain, supportive human habitat while maximizing biodiversity and essential natural services from the biosphere,

We must pledge to adjust our individual and societal behavior so that it is compatible with biosphere integrity

instead of further modifying the biosphere so that our technological and economic society can expand and grow to eventual collapse.

Positive Strategies

Prevention and Protection

Ecological Restoration

Utilization

"The next century will, I believe, be the era of restoration in ecology." E.O. Wilson, 1992

"If the Earth is to maximize its performance through full cycle, a human culture will be needed that helps environmental restoration." H.T.Odom, 2001

WHAT IS IT ???

ECOLOGICAL RESTORATION

THE INTENTIONAL ACTIVITY THAT INITIATES OR ACCELERATES THE RECOVERY OF AN ECOSYSTEM WITH RESPECT TO ITS *HEALTH*, *INTEGRITY*, AND *SUSTAINABILITY.*

ECOLOGICAL RESTORATION

ATTEMPTS TO RETURN AN ECOSYSTEM TO ITS HISTORICAL TRAJECTORY

RECOVER AS MUCH HISTORICAL AUTHENTICITY AS CAN BE REASONABLY ACCOMMODATED

ECOSYSTEM HEALTH

THE STATE OR CONDITION OF AN ECOSYSTEM IN WHICH ITS DYNAMIC ATTRIBUTES ARE EXPRESSED WITHIN "NORMAL" RANGES OF ACTIVITY *RELATIVE TO ITS ECOLOGICAL STAGE OF DEVELOPMENT*

ECOSYSTEM INTEGRITY

THE STATE OR CONDITION OF AN ECOSYSTEM THAT DISPLAYS THE BIODIVERSITY CHARACTERISTIC OF A REFERENCE CONDITION, SUCH AS SPECIES COMPOSITION AND COMMUNITY STRUCTURE, AND IS FULLY CAPABLE OF SUSTAINING NORMAL ECOSYSTEM FUNCTIONING

ECOSYSTEM SUSTAINABILITY

- THE ABILITY OF AN ECOSYSTEM TO MAINTAIN ITS GIVEN TRAJECTORY INSPITE OF STRESSES AND PERTURBATIONS
- ACHIEVED IN PART ON THE BASIS OF THE CAPACITY FOR ECOLOGICAL RESISTANCE AND RESILIENCE
- ALWAYS A DYNAMIC EQUILIBRIUM
- WILL LIKELY REQUIRE CONTINUED HUMAN INFLUENCE TO ACCOMPLISH AND MAINTAIN

- WE PARTICIPATE IN THE DYNAMICS OF ECOSYSTEMS AS WE RESTORE
- WE BECOME PERFORMERS IN AN ON-GOING PROCESS OF REMEDY AND IMPROVED ECOLOGICAL FUNCTIONS
- ECOLOGICAL RESTORATION IS PLACE MAKING; CONNECTING US TO OUR OWN LIFE'S CONDITION AND HELPS US UNDERSTAND WHO WE ARE, WHERE WE ARE.

SOME PRINCIPLES FOR

PLANNING

ECOLOGICAL RESTORATION

GUIDELINES FOR
DEVELOPING & MANAGING
ECOLOGICAL RESTORATION PROJECTS

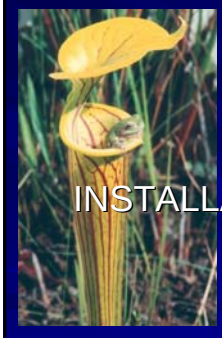
RESTORATION DESIGN

DEVELOPMENTAL PLANNING

WITHIN A SYSTEMATIC FORMAT

FORMAL PLAN

- A SERIES OF SPECIFIC WRITTEN RESPONSES TO INDIVIDUAL PROJECT ISSUES
- COLLECTIVELY NARRATED AS A COMPREHENSIVE WORK
- USED AS A GUIDANCE DOCUMENT FOR PLANNING & EXECUTING RESTORATION PROJECTS OR INITIATIVES
- AND IN ITS ESSENCE, ASSURES THE COMPREHENSIVE TREATMENT OF ALL PERTAINENT RESTORATION ISSUES



INSTALLATION PLANNING

SUCCESSFUL RESTORATION ACHIEVED ONLY WITH

THOROUGH CONCEPTUAL PLANNING

METHODICAL AND ADAPTIVE INSTALLATION

EVALUATION

STATEGIES FOR A NON-NATIVE INVASIVE SPECIES CONTROL PROGRAM

ARE DETAILED

WITHIN THE FRAMEWORK FOR THE CONCEPTUAL AND INSTALLATION PHASE

IN AN *ECOLOGICAL RESTORATION PLAN*

An exotic species of plant or animal (organism) is one that was introduced into an area where it did not previously occur through relatively recent human activities.

- In **CULTURAL LANDSCAPES**, exotic and non-native species are frequently an integral part of an ecosystem, particularly as crops and livestock, and even ruderals that have presumably co-evolved with domesticated species.
- Such species are acceptable for cultural restoration.

- IN ***NATURAL ECOSYSTEMS***, NON-NATIVE INVASIVE SPECIES COMMOMLY COMPETE WITH AND REPLACE NATIVE SPECIES, THREATENING BIODIVERSITY AND ECOSYSTEM INTEGRITY.
- Such species are not acceptable for ecological restoration.

In some instances**, non-indigenous plants are used** for a specific purpose in the restoration project, for example as cover crops, nurse crops or nitrogen fixers.

Unless these are relatively short-lived, non-persistent species that will be replaced in the course of succession, their eventual removal should be included in restoration plans.

But use caution in selecting species for use !

PROBLEM INVASIVE SPECIES ON CONSERVATION SITES IN ALABAMA

Cogongrass	*Imperata cylindrica*
Kudzu	*Pueraria montana*
Chinese Privet	*Liqustrum sinense*
Chinese Tallow	*Sapium sebiferum*
Nepalese Browntop	*Microstegium vimineum*
Japanese Honeysuckle	*Lonicera japonica*
Air Potato	*Dioscorea ulbifera*
Japanese Climbing Fern	*Lygodium japonicum*
Mimosa	*Albizia julibrissin*
Tree of Heaven	*Ailanthus altissima*
Bush Honeysuckle	*Lonicera spp.*
Chinese Wisteria	*Wisteria sinensis*
Princess Tree	*Paulownia tomentosa*

- **It is Essential for a restoration plan to be developed for *each* NON-NATIVE INVASIVE species present, based upon its specific biological, economic and logistical realities.**
- **Highest priority is best reserved for the control or extirpation of those species which pose the greatest ecological and social threats.**
- **These include invasive plant species that are particularly mobile and pose an ecological threat at landscape and regional levels, and animals that consume or displace native species.**
- **Care should be taken to cause the least possible disturbance to indigenous species and soils as exotics are removed.**
- **Quick solutions to biological problems are almost always the wrong solutions and some projects will take considerable time to complete.**

The Goal

- Eliminate invasive populations or safely manage populations to achieve containment at lowest levels
- While minimizing impacts to native vegetation and maintaining ecological integrity of surrounding indigenous communities.
- The result of a well conceived ecological restoration strategy should **minimize habitat losses** due to invasive plant infestation, **minimize impacts on endangered species** via habitat loss or alteration, **prevent such loss by comprehensive planning** and **reduce the socioeconomic impact** of invasive populations.

Develop Systematic AND Integrated Extirpation Plans

- Establish priority targets within the geographic areas for treatment.
- Description of the Integrated Management Program to be used on the targeted species.
- A detail of all implementation and treatment strategies.
- The establishment of time schedules for the initiation and completion of applications specified in the Integrated Management Program.
- Establish assessment criteria and long-term monitoring methods
- Define procedures for CONTINUED programmatic communications

IMPLEMENTATION APPROACH

- **Population Inventory and Mapping**
- **Monitoring and Baseline Data**
- **Analysis and Prioritization**
- **Autecology Data, Physiological Data, Literature Review and Current Research Data**
- **Control Methods Assessment**
- **Implementation Scheduling**
- **Monitoring and Analysis**
- **Future Strategies**

Control Methods Assessment

- **Manual / Mechanical Removal**
- **Physical Control**
- **Herbicide Treatment**
- **Fire**
- **Water Level Manipulations**

Implementation Schedule

Create scheduling descriptions that detail the time needs for conducting and completion of the implementation tasks specified for the ECOLOGICAL RESTORATION GOALS:

Dates	Action
8/05	Population Inventory, Mapping and Assessments
8/05	Treatment Area Designations and Establishment
8/05	Manual and Mechanical Removal of Woody Vegetation from Treatment Areas
9/05	Mowing and Removal of Cogongrass Biomass
	Fire Applications as appropriate
	COMPLETION DATE: 9/30/05
9/05	Acquisition of Chemicals, Equipment and Supplies
9/05	Obtain Cooperative Agreements with Partners and Cooperators
10/05	Prepare Equipment and Materials for Application
10/05	Monitor Cogongrass Regrowth (8 - 10 " Guideline)
11/05	Glyphosate Applications
12/05	Evaluate Initial Treatment Response
3 / 06	Evaluate Flowering Events and Document
3 / 06	New Population Inventory Inspection
4 / 06	Operational Prescribed Fire Applications
7 / 06	Population Inventory, Mapping and Assessment
7 / 06	Treatment Area Determinations
7 / 06	Re-Treatment Evaluations
9 / 06	Preparation Treatments
	Mowing, Fire, Mechanical as necessary
10 / 06	Equipment Preparations and Material Acquisitions
10 / 06	Monitor Cogongrass re-Growth
11 / 06	Glyphosate Re-Applications
12 / 06	Evaluate Treatment Effects

Future Strategies

Program strategies must be informed from many sources and systematic, adaptive approaches will provide viable and meaningful long-term management.

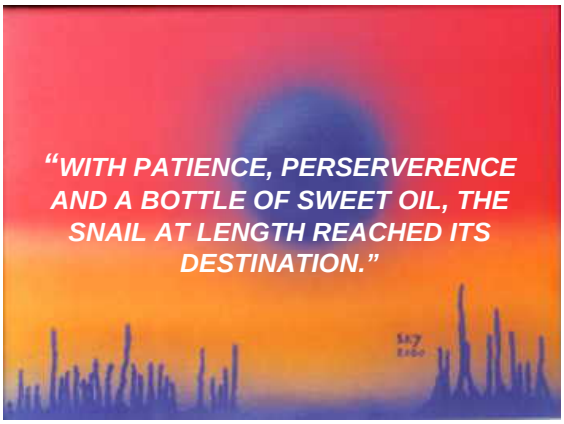
- **Engage people and communities**
- **Long term monitoring**
- **Native plant community replacement**
- **Replacement communities**
- **Control additional management practices and information feedback linkages**
- **Cooperative agreements or initiatives**
- **Educate the public and policymakers**
- **Research efforts**

Multiple Practices May Be Necessary

Bio-controls after escape and invasion
Habitat rehabilitation function improvements
Human labor, minds and money
Machinery and tools
Use of Fire and other ecological stressors
Non-Chemical Treatment Opportunities
Herbicides
Native vegetation re-introduction
Monitoring
Conservation Stewardship
Prevention

Even if all exotic species are removed from the restoration site, the opportunity for reinvasion may remain high.

REMEMBER: *Success is never final.*



The reverence of conserving nature is imbedded in who we are, personally and collectively, and it is born of the places we love.

By protecting more and larger landscapes and practicing successful ecological restoration to support maximum biodiversity and life on Earth, we also save the landscapes of our hearts, our souls, our very being.

The Nature Conservancy
SAVING THE LAST GREAT PLACES ON EARTH

The mission of The Nature Conservancy is to preserve the plants, animals and natural communities that represent the diversity of life on Earth by protecting the lands and waters they need to survive.

www.ser.org

Society for Ecological Restoration International
SER ONLINE

Coastal Plain Chapter

Of The Society for Ecological Restoration International

http://www.ser-coastalplains.org

ISI

The Nature Conservancy
SAVING THE LAST GREAT PLACES ON EARTH

The Nature Conservancy's Invasive Species Initiative

http://tncweeds.ucdavis.edu/

" I know of no restorative of heart, body and soul more effective against hopelessness than the restoration of the earth."

Barry Lopez

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Father Sun, Mother Earth, Brother Fire, Sister Wind, Dancing Waters

Turtle