

1106 TEASE

ALAN ALDA

This bison bull is going to have 30,000 acres of restored prairie to roam in. He's one of the lucky ones. On this edition of Scientific American Frontiers – working to give wildlife the space it needs.

ALAN ALDA (NARRATION)

On the Plains, they're trying to bring America's great grasslands back to life.

While the continent's most endangered mammal is looking for a home.

In the air, long-distance travelers are fighting for space on two different continents.

And around the globe, wilderness everywhere hangs in the balance.

PETER RAVEN

What kind of a world do we want?

ALAN ALDA

I'm Alan Alda. Join me now in the Wild Places.

SHOW INTRO

ALAN ALDA

This is prairie. It's a French word meaning "meadow" -- but what a meadow. The early French explorers who first used the term couldn't have had any idea what they had stumbled across. The area we call the Great Plains was once the greatest grassland on Earth, covering over a quarter of the continental US, stretching up into Canada and down into Mexico.

But now there's only about one percent of original prairie left. It succumbed to the tide of railroads, steel plows, barbed wire, cattle and settlers that began to flood west 150 years ago.

We lost an enormous interlocking community of plants and animals, but of course we did get something in return. The Great Plains now yield roughly 25% of the entire world harvest of wheat, oats, barley, rye, sorghum and corn.

That process, the replacement of the Earth's wild places by domesticated landscapes, has been going on for about 10,000 years now, ever since people invented agriculture. Today that action is concentrated in the belt of tropical forests that girdle the Earth, and later in the program I'll be talking with Peter Raven, one of the world's best known advocates of forest conservation, about why we should care about losing wilderness.

We'll also be looking at how development is affecting one of the globe's great long-distance migrations -- the flight of the white stork between Europe and Africa.

But first -- the prairie. There's now a significant movement to restore some of what we've lost. To bring back to at least parts of the Plains the essential wildness they once had. Reassembling a working ecosystem is a little like trying to put Humpty Dumpty back together, but a few places are beginning to be wild places once again.

PRAIRIE COMEBACK

ALAN ALDA (NARRATION)

First light, on the prairie.

We're in northeast Oklahoma, to witness a tradition that stretches back all of 7 years, but with ancient roots.

It's the annual bison roundup on what was once the Chapman-Barnard cattle ranch.

Stampeded into the corral, by cowboys in pickup trucks, are the first of over 1,000 bison -- also known as buffalo.

5,000 years ago the stampede would have been started by Native American hunters, using a ring of fire set in the prairie grass -- although probably not during a downpour like this.

Today there'll be no feasts of fresh bison meat, but instead a systematic checkup of each animal to make sure this precious herd stays in peak condition.

In 1989 the ranch became the Nature Conservancy's Tallgrass Prairie Preserve, the largest prairie restoration project on the continent.

ALAN ALDA

I don't want to get, you know, unduly nervous, but... they're heading for us.

BOB HAMILTON

Yeah.

ALAN ALDA

Yeah. Well maybe we should just step inside the thing here.

BOB HAMILTON

They like us.

ALAN ALDA

No, I think we should step inside the corral. You want to come with me or are you just gonna stand out there?

BOB HAMILTON

Oh no no... they know me.

ALAN ALDA

Well, that wasn't so bad.

BOB HAMILTON

No, no.

ALAN ALDA

Kinda easy. They are coming back!

BOB HAMILTON

They have a very strong, bison have a very strong herding instinct.

ALAN ALDA

Yes, so do I. What do they do for the land? Why... why are you so concerned about bison as far as the land is concerned?

BOB HAMILTON

In Great Plains grasslands, you're looking at grazing and fire, are really the two management forces that we're trying to put back into these landscapes. And bison were the primary, the premiere historic grazer in the Great Plains.

ALAN ALDA (NARRATION)

But the bison were too easy a target. In the 1860s special excursion trains, riding the new railroads, brought random and widespread slaughter deep into the Plains.

Most carcasses, killed for fun, were left to rot.

Then in the 1870s, bison robes became all the rage, and the collapse of the great herds began.

It's almost incomprehensible, but by 1900, 60 million animals had been reduced to a few hundred total, most in zoos and private herds.

Settlers moved in where Plains Indians and the bison they depended on had co-existed for thousands of years.

Teams of "prairie breakers" as they were known used oversize plows to expose the rich soil for the homesteaders' crops of corn and wheat.

John Deere's steel plow, invented in 1835, was tough enough to bust open the tangled prairie sod – itself a material strong enough to build houses with.

America's great unbroken grassland – our Serengeti – is gone forever.

Parts of the arid short-grass prairie, closer to the Rockies and now used for grazing, could be prairie again.

But in wheat and corn country – the Dakotas, Nebraska, Kansas, Iowa, Illinois – we couldn't bring the prairie back if we wanted to. The whole system of native plants and animals has simply disappeared.

Except, that is, on the Chapman Barnard Ranch. It was never plowed, so every prairie plant is here, somewhere on its 38,000 acres.

It seems strange to immediately start burning things up, but that's exactly what the Nature Conservancy did when they moved in. I'm about to find out why.

HARVEY PAYNE

Well, Alan, I hate to tell you this, but the cowboy custom is, the person on the right has to get the gate.

ALAN ALDA

Okay, I'll be a good cowboy. One second.

ALAN ALDA (NARRATION)

Extremes of heat, cold, drought and storms are normal here -- not so comfortable for us modern cowboys, but they kept the prairie ecosystems happy.

In spite of the weather Harvey Payne, the preserve director, offered to show me the secrets to prairie restoration.

ALAN ALDA

Just call me Slim.

HARVEY PAYNE

Okay, how about Tex?

ALAN ALDA

Tex is good.

ALAN ALDA (NARRATION)

One secret is size. This place is big – 50 square miles – so there’s room for different things to happen in different places.

Our first stop was here, in an area that was burned in late August, about 2 months ago, leaving enough time before winter for warm-season grasses to re-sprout.

HARVEY PAYNE

The bison, once they're released from the corrals will utilize this area very heavily.

ALAN ALDA

Because this is the new growth that they like so much?

HARVEY PAYNE

Yes, it is. They will use the re-growth from a burned area almost exclusively to all other parts.

ALAN ALDA (NARRATION)

Prairie plants have specially deep root systems, so they can survive both drought and fire.

When the hot fire passes above, the roots below are unharmed and even stimulated by the warming of the soil.

The animals will graze here all winter and into next spring. At that point there’ll be a dramatic change – all the broadleaf plants, which bison won’t eat, will come back very strongly, because there’s no competition from the overgrazed grasses.

Harvey showed me the result on this patch.

HARVEY PAYNE

This area was burned a year ago last summer and it was used very heavily by the bison in the first growing season. The bison have grazed the grasses very closely to the ground, allowing the broadleaf plants to exhibit themselves much more dramatically.

ALAN ALDA (NARRATION)

The broadleaves produce flowers and seeds, which in turn attract insects, birds and small mammals. Then over a few years the bison will find a new burn area, grasses will come to dominate again, and

the patch will end up like this – with a thick thatch of grasses, ready to burn once again.

It's this shifting interaction between burned patches and bison which is the biggest secret of the prairie.

It may look tranquil and settled, but it's a jungle out there. Things are always changing, and for every slight alteration there's a plant, an insect, a bird that's perfectly adapted to the new conditions.

So real prairie, they've discovered here, is not just grassland. It's hundreds of tiny subsystems, all mixed up.

HARVEY PAYNE

We call this a disturbance-dependent landscape. And those disturbances are fire and grazing primarily by bison. But that's what shaped this ecosystem. And that's what's allowed the 750-plus plant species here to develop and to flourish. That's what happened to allow all the different bird species, the insects, the reptiles, the amphibians, nematodes in the soil.

ALAN ALDA (NARRATION)

Already at the Preserve you can see the richness coming back to prairie life. Prairie chickens – grouse – like to feed on new growth, but nest in mature grass.

Sandpipers prefer the partial shelter of young grass.

Rare harrier hawks follow the mice, and the mice are where the best seed crops happen to be.

Multitudes of insects are attracted to many different flowers.

And it seems there's a dozen different flowering plants for every week of spring and summer, every different patch of light or shade or passing shower.

Once these constant ripples of change were flowing across millions of square miles. But now the challenge is to maintain them over just 50.

HARVEY PAYNE

That patchwork dynamics took place on a large scale in the tall grass prairie as an ecosystem. We're trying to reduce that scale in size to this preserve.

ALAN ALDA (NARRATION)

Here's the deliberately complicated burn pattern they're developing for the first third of the Preserve so far.

About 50 different patches get either a Spring, Summer or Fall burn, about every 5 years.

Manipulating the land like this is truly a return to an earlier age, because the prairie was largely created by people.

For thousands of years Native Americans set fires to attract bison to the new growth, probably more fires than were started by lightning.

So over time, every plant and animal became adapted to fire and bison.

Nature's machinery is perfectly tuned. Seeds caught in the bison's thick coats, for example, get spread across the land – especially when the animals wallow in the dust.

Eventually the bison wallows make seasonal ponds, which attract birds and snakes, which then... Well, you get the idea.

We're back on the Preserve, at the start of the roundup.

1,300 bison are out here somewhere, but where?

Most of them are exactly where you'd expect -- on the newly burned patches.

It takes a week to drive the herd into progressively smaller enclosures.

And every year a few just can't be caught – usually the strongest, most experienced bulls, that can outmaneuver anything.

Cows with this year's calves are the easiest to catch, and that's an important conclusion, because the long term goal is to imitate ancient hunting pressure from wolves and Native Americans. So once they've built up the herd to the limit of about 3,000 on their 30,000 acres, they'll sell off mainly calves.

Eventually the whole herd, minus a few bulls, is collected in one 50-acre pen.

Then for about a week, batch after batch of animals is processed through the corrals.

For these cowboys, it's like working with stronger, faster, more aggressive cattle – although that doesn't prevent some pretty daring moves every now and then.

This year's calves are separated out to get their vital brucellosis shot. Brucellosis is a serious cattle disease, and the Preserve has to co-exist with its cattle-ranching neighbors.

The calves will rejoin their mothers later. All the rest go down the chute.

Every animal has its computerized record and its place in the herd structure. So this is a simulated wild herd.

But they're still wild animals nonetheless.

ALAN ALDA

These guys are frisky here. Okay, go ahead. Go, go!

ALAN ALDA (NARRATION)

The whole chute has to be higher, stronger and tougher than what you'd use for cattle.

There are routine shots for parasites and other cattle diseases – also to be good neighbors.

BOB HAMILTON

They've all got microchip transponders in their ears. These tags...

ALAN ALDA

How do you get this guy's job over here?

RANCHER
You make him mad.

ALAN ALDA
Whoa!

RANCHER
I've been a bad boy!

BOB HAMILTON
As you can see, right... right there...

ALAN ALDA
Aha, yeah.

BOB HAMILTON
... is the tag. It's just a small plastic tag. It has a microchip inside of it. So you...

ALAN ALDA
Who gets to put the tag on his ear?

BOB HAMILTON
We put them in typically as yearlings or calves.

ALAN ALDA
Oh, I see -- when they're a little more manageable.

BOB HAMILTON
... easier to handle, yeah.

ALAN ALDA
And what kind of information is in that tag?

BOB HAMILTON
Basically kind of like a social security number.

ALAN ALDA
How do you decide what happens to the animals after they leave this point?

BOB HAMILTON
Well, it's all determined beforehand who stays and who goes. By knowing the complete structure of the herd, then you can sit down in the comfort of your office and figure out what the carrying capacity is for next year and the year after. As they come through then, we can identify those animals and basically they have been flagged. So, OK this is a 15-year old cow, you know this is her year to go.

ALAN ALDA (NARRATION)

Before long I was wondering if it was my year to go.

BOB HAMILTON

Just lean in there. Don't get too close, especially to the adults. They will sucker you in to where you think...

ALAN ALDA

They'll sucker me in?

BOB HAMILTON

Yeah, yeah. You think they're at their full extent...

ALAN ALDA

Oh yeah.

BOB HAMILTON

... and you'll lean in and they'll lunge out and they've got another 18 inches to go and you'll get a horn in the ear.

ALAN ALDA

Okay.

BOB HAMILTON

You're on.

ALAN ALDA

Oh great. Whoa.

BOB HAMILTON

Watch out. Watch out for the equipment there. There you go.

ALAN ALDA

Did you get it? Did we get it?

WOMAN

Got it.

ALAN ALDA

We got it. Good. Take this. I'll see ya... I'll be at the luncheonette.

ALAN ALDA (NARRATION)

One surprise this year – they finally caught up with this terrific 1,600-pound bull.

He was not happy about it.

Brought in from Montana 2 year ago, he never got his microchip tag.

BOB HAMILTON

He was a no show last year. He didn't cooperate in the round up.

ALAN ALDA (NARRATION)

Regularly introducing genetic variety with new animals is another key part of managing the herd.

The Tallgrass Prairie Preserve is a highly successful restoration project, but it's also a paradox. To stay wild it's going to need human intervention forever. And that's becoming the case with wilderness everywhere, as we'll see.

LIFE IN DOGTOWN

ALAN ALDA (NARRATION)

We're in the middle of town here – a prairie dog town.

Once they were everywhere on the Great Plains grasslands – 5 billion animals by one estimate.

With only about a dozen large towns left – more than 10,000 acres – prairie dogs were recently declared a threatened species.

That's bad news for the animals that this center was built to save – the black-footed ferret.

Ferrets are totally dependent on prairie dogs. They hunt them, and live in their burrows.

In the mid 1980s, the last 18 black-footed ferrets were brought in from the wild for captive breeding.

When our Frontiers cameras were here in 1993, the project was proving very successful, with 450 ferret kits, as they are called, born here and in several zoos. It's 5 times that number now.

The goal from the start was to reintroduce ferrets to the wild. But that's turned out to be much harder than anticipated.

Just as you cannot have real prairie without bison, you cannot have wild ferrets without prairie dog towns.

The remaining large prairie dog towns were surveyed. This one's near Medicine Bow, Wyoming, a couple of hundred miles from where the last 18 ferrets had been captured.

Biologist Patrick Millica from Wyoming Game and Fish Department walks a series of transects through the town to estimate the density of burrows.

The town looks to be thriving, with about 25 active burrows per acre – maybe 20 animals in each of its 20,000 acres. But a single ferret will eat one prairie dog every 3 or 4 days, so this town's probably large

enough to support a colony of ferrets. And that's assuming the prairie dog town continues to thrive.

ANNOUNCER

There's Casey Smith, on a horse called Bird -- number 9. Whoa! Smith! Come on Smitty! Yeah--rake him son! Go for it now buddy. Whoa! These are happy fairback rides tonight!

ALAN ALDA (NARRATION)

It's no secret that cowboys hate prairie dogs. The widely held belief is that they compete with cattle for forage.

Most ranchers are dead set against re-introduction of ferrets on their land, or any future measures to protect prairie dogs.

WAYNE WHITE

If we can't control the prairie dogs on our private land where there's ferrets, who would want to buy it? You can't make a living off of it with prairie dogs on it, and it's definitely gonna make an impact on us.

ALAN ALDA (NARRATION)

Biologists now believe prairie dogs actually enhance the productivity of rangeland.

But old ideas die hard.

WAYNE WHITE

He's dead.

ALAN ALDA (NARRATION)

For most of the 20th century it was US government policy to promote the extermination of the prairie dog. Teams of hunters systematically bulldozed, poisoned, gassed and shot the animals in their millions.

Many predators – eagles, foxes, badgers and others –suffered, but none more so than the black footed ferret.

These ferret kits are just 2 months old. It's July, and in another month they'll be fully grown and needing to live alone.

The captive breeding program tries to mimic the normal behavior of female ferrets. First she feeds her young with meat she has hunted. This is a mixture of mink chow and ground rabbit.

All the kits get some prairie dog meat, to make sure they know it's good to eat.

Finally, the kits are introduced to live prairie dogs in a plastic burrow in the lab.

The young ferret is right to be cautious. Prairie dogs are often bigger, and ferrets are frequently injured while hunting their prey.

Eventually instinct – or hunger – takes over.

The ultimate in training is provided by this elaborate artificial prairie dog town.

It's regularly stocked with live prairie dogs, and it was devised in response to a disappointing development. Early in the program, entirely lab-raised ferrets were released into the wild – but only about 10% survived their first month.

Every night for a few weeks the young ferrets can learn how to live, and hunt, in a complex environment that's much more realistic than the lab. This is similar to what female ferrets do when they distribute their young in a prairie dog burrow system, before finally leaving them to fend for themselves.

BIOLOGIST

Frequency is point 656.

ALAN ALDA (NARRATION)

The procedure for releasing the young ferrets in the fall is as painstaking as their upbringing.

Some animals get a radio collar to allow tracking after release, and there's a dye marker to distinguish the release year. The animals are lightly sedated for all this. They'd be impossible to handle otherwise.

Ready to go -- a healthy 4-month-old.

The Medicine Bow, Wyoming prairie dog town was the first release site used. 49 young ferrets were released in 1991, with the reluctant cooperation of local ranchers.

There have been several releases here since, and at 6 other sites in Arizona, Montana, South Dakota and Utah. Nearly 1,000 young ferrets, all descended from the original 18, have now been released.

In one release method the animals spend about a week getting used to the site, but inside a cage. They're regularly left fresh prairie dog meat.

Then one night, they're on their own.

What happens to the animals next is the all-important question.

BIOLOGIST

It's moving right below station 6.

ALAN ALDA (NARRATION)

A large team of state and federal biologists has tracked the collared animals, and there have unfortunately been many casualties.

Sometimes it's as simple as a lost collar.

BIOLOGIST

Well, there it is. Lost collar.

ALAN ALDA (NARRATION)

Some animals are eaten by predators, some are run over, many just disappear.

The good news is that up to 70% of ferrets that are "preconditioned", as they call it, in the artificial prairie dog towns, survive their first year – much better than lab-raised animals. So preconditioning is now standard.

The bad news is that so far a self-sustaining population of ferrets has only become established at 1 of the 7 release sites. And 5 of the sites have had outbreaks of plague, which kills prairie dogs and ferrets.

The search is on for new healthy, and large, prairie dog towns.

So right now, in spite of all our efforts, we don't know if black-footed ferrets have a future in the wild.

RAVEN'S WORLD

ALAN ALDA (NARRATION)

The Missouri Botanical Garden in St. Louis. I'm visiting its director, Peter Raven.

We're heading for the Garden's signature half-acre geodesic dome, now a 40-year-old classic.

ALAN ALDA

Now is this a rainforest?

PETER RAVEN

It is up here. It's warmer and then it's cooler down there. So over here we can grow plants that are really from tropical rain forests, and as you go down towards the west here you get into plants that are from cooler and cooler places, like the islands in the Pacific or from cloud forests. Basically we try to build as much variety in here as we can, so people can get a good idea of what it's like in the tropics.

ALAN ALDA

Is this place mostly for people to become educated about rainforests in general, or do you actually do research on these plants here?

PETER RAVEN

It's mainly to educate people about what the plants are like in the rainforests and other kinds of tropical forests around the world.

ALAN ALDA

So these plants are, in a way, in an environment that they wouldn't find themselves in the natural world.

PETER RAVEN

Well, the temperature and the humidity and all are about the same. I mean, one of the funny things is it's really cooler in the tropics than it is in St. Louis in the summer.

ALAN ALDA

So you have to air-condition it.

PETER RAVEN

We need to actually cool the place...

ALAN ALDA

...to keep it tropical. What's happening?

PETER RAVEN

Vents are opening or something because the temperature is hitting some kind of a critical level. It'll be over in a minute. It's something like opening vents.

ALAN ALDA

You just have to think about temperature or mention it and the windows open.

PETER RAVEN

No actually, that's what I wish.

ALAN ALDA (NARRATION)

In Raven's 30 years as director, the Garden's sparkling public displays have gone from strength to strength. They're comparable to the New York Botanical Garden, or Kew Gardens in London.

But Raven's done something else here, that the public doesn't see. This is now one of the leading plant research centers in the world, and the headquarters of attempts to save US endangered plants.

Raven has been a passionate conservationist since the 60s when, on academic field trips, he saw the reality of mass extinction developing in the tropics.

Mixed in with the plants being raised for display are some of the rarest plants in America, saved in the nick of time from extinction.

PETER RAVEN

This is a medlar. It's a plant that was discovered about twelve years ago. A little tiny grove of these, with just 26 individuals was discovered in Central Arkansas. The whole genus, the whole kind of plant was unknown in North America before.

ALAN ALDA

Is there something special you can learn when you have a plant like this that seems to be unique. I mean that's so different from it's neighbors?

PETER RAVEN

All that we know is that since it's very unique, since it's so unusual, it may have characteristics that are outstanding.

ALAN ALDA (NARRATION)

Here's a unique lobelia from Hawaii, with fewer than 200 in the wild.

Here's a rare member of the pea family, from Tennessee, and here's a groundnut with 25 little patches left in the Midwest.

So why should we care about a rare medlar from Arkansas?

PETER RAVEN

This is a plant in the rose family which has lots of plants of economic importance: apples, plums, peaches, strawberries and so forth. So it could be that the genetics of this particular plant would be of interest in relation to economic uses of the rose family directly. But we just don't know. We're barely getting the tools to even be able to think about those questions.

ALAN ALDA

In a way, letting this go would be like burning down a library that had only one copy of each book.

PETER RAVEN

Letting any species go is like that.

ALAN ALDA (NARRATION)

One of Raven's favorite projects at the Garden is a 15-acre Japanese garden. It's vital, he says, for Americans to learn about others, and to understand what's going on out there. It's a crisis, and the prognosis is clear.

PETER RAVEN

We'll lose about half of all tropical species during the course of the next century, which amount to about a third of all the species on Earth.

ALAN ALDA (NARRATION)

The images by now are familiar.

Tropical forests are rapidly disappearing, at the rate of about 10 square miles a day – 2% a year.

Forest is fatally attractive. The timber's worth money, and the space gives room to expand. Developing countries need both, as they aim to follow the way we in the industrialized countries do things.

ALAN ALDA

Why is it important not to let species go extinct? What difference does it make? Does it make a difference to us as humans? Does it make, I mean, will we perish if a certain critical number of species become extinct?

PETER RAVEN

It's not that we're not gonna survive. We're gonna survive. We're gonna survive in whatever kind of a world we build for ourselves. The question is, shouldn't we be capable of making intelligent choices not of survival but of what kind of a world do we want?

ALAN ALDA (NARRATION)

In Raven's world, people acknowledge that we are part of nature, that we evolved in wild places side by side with nature's diversity, and that we have no right to destroy these wonderful things.

Who could disagree with such an idea when faced with the beauty of the forest? Raven helped coin the term biodiversity to describe the huge range of species that fit together to make ecosystems – like tropical forest or the American prairie.

The problem is the forces arrayed against advocates like Raven are immensely powerful, and some would say unstoppable.

Just look at our own short history.

FILM NARRATOR

To make a million acres bloom anew. To build an industrial empire from the wasted power of the Columbia.

WOODY GUTHRIE (SONG)

Now river you can ramble where the sun sets in the sea.
But while you're rambling river, you can do some work for me.
Roll Columbia, won't you roll, roll, roll.
Roll Columbia, won't you roll, roll, roll.

ALAN ALDA (NARRATION)

It took us only about 300 years to dam every major river from the Atlantic to the Pacific, cut down all but 2% of the original forest, and plow under a million square miles of prairie.

We literally took nature apart, without really understanding it.

In the process we found prosperity, and pollution.

But now the tinkering is becoming global in scale. Scientists agree we're changing the climate -- and what else could we be doing?

PETER RAVEN

I think we have to think of the dictum of the great American conservationist Aldo Leopold who said "the first rule of intelligent tinkering is to save all the cogs and wheels."

ALAN ALDA

So you don't leave 'em out when you put them back together.

PETER RAVEN

When we're learning...when we're learning what we can do, that's just the time that we ought to be concerned about saving the parts that we can do it with.

ALAN ALDA

Is the developing world going to catch up with us and surpass us, do you think, in the ability to wreck things? How is that gonna work?

PETER RAVEN

Well, 20% of the people in the world live in developed or industrialized countries. We have about 85% of the world's economy, use about 80% of the industrial energy, have about 90% of the world's scientists and engineers. So, that's about proportional to our impact on the world's ecosystems, about proportional to the amount of pollution that we produce and amount of waste that we produce and the destruction of natural environments. It is our pressure on the world that is really causing most of the damage, directly or indirectly.

ALAN ALDA

And yet we're always worried and always preaching to the developing world that as they develop, they better not develop the way we did.

PETER RAVEN

If everybody in the world lived as we do in the United States, it's estimated it would take about two more of additions of planet Earth to accommodate everybody and we haven't got it.

ALAN ALDA (NARRATION)

People have to understand, says Raven, that we humans are inseparable from the natural world. We use it all the time.

PETER RAVEN

When New York City wanted to purify its water about ten years ago, it found that it had two choices: it either could put about five billion dollars in new water purification plants or it could put about one and a half billion dollars in restoring the watersheds in the Catskills. It was an easy choice.

ALAN ALDA (NARRATION)

More often those choices are not so easy, or so obvious.

For example, we filled in a fifth of our wetlands before we fully understood how they purify water, recycle nutrients, absorb floods, and provide nursery grounds for marine life.

There may be as many as 20 million insect species in the world. Most are in tropical forests, but many are right here at home, working hard to pollinate our crops. We don't know the effects of destroying a large part of the globe's insects.

And we don't know how effectively polluted oceans will continue to help regulate the global atmosphere – which is just one of the things they do, as do forests.

Biologists are now calling these natural processes, ecosystem services.

PETER RAVEN

They've been estimated by some economists as worth \$37 trillion or some arbitrary number like that. But actually, it's pretty easy to see that they're priceless. If we didn't have them, we'd all be dead so we wouldn't be worrying about what they were worth.

ALAN ALDA

It seems to me that that points to the incredible complexity of nature, and of this system that we're all hooked into. When you talk about our interconnectedness, that sounds like it makes it especially difficult to know what piece you can pull out without the whole thing collapsing.

PETER RAVEN

That's right. It's not only incredibly complex, but it is our basic habitat. It's the resource or it's the area into which we evolved. You see, 400 generations ago, just 400 generations, 10,000 years ago, there were only a few million people in the whole world. It's really only been the invention of crop agriculture that's allowed the global population to build up to where we're cultivating an area the size of South America, producing food, producing poets, musicians, specialists of all kinds that create what we call civilization. But it all relates ultimately on the ability of natural systems to be able to support us.

ALAN ALDA (NARRATION)

The nightmare that Raven foresees is growing poverty and population driving a quickening pace of ecosystem destruction in developing countries.

The only possible answer, he believes, lies with new ideas – especially new science – coming from within developing countries themselves.

PETER RAVEN

One out of every four people in the world get by on a dollar a day. And the women and children in those societies have no opportunity whatever to contribute to human progress, because they spend their whole time carrying fuelwood and water over great distances back to smoky, carcinogenic huts. That's a way of insuring that the human race will not make the progress that it can. What I would like to do is to be able to build up the 10% of the world's scientists and engineers that exist in developing countries, into responsible groups in those countries that would be able to advise their governments and their people how to achieve the aims that they want: sustainability, health, relative prosperity, dignified lives in which people can contribute. So a lot of our energy here in the Garden, and a lot of my personal energy, is devoted to building institutions, and to empower people in developing countries to be able to take care of their own futures adequately.

ALAN ALDA (NARRATION)

And what about us in the rich countries? It's the same answer, he says. We need to consume fewer of the world's resources, but we can live just as well if we get smart and use science.

That's the first thing. The second may be a little harder.

PETER RAVEN

If there would be a single thing that we could do in the United States that would support global sustainability in the future, and the most possible options for our grandchildren and their grandchildren, it would be to bring our fellow citizens and ourselves to our senses about the fact that we live on a single planet Earth, with magnificent diversity run by people in something like 200 different nations, and that we all are managing this beautiful planet together. Promote a spirit of internationalism in the United States. Help people understand why it is that we depend on countries all over the earth, and do something about it -- in our schools, in all of our social groups, and in any way that we can.

ALAN ALDA (NARRATION)

Let's hope it works out. Otherwise this stuff may only exist in St. Louis.

FLIGHT INTO THE UNKNOWN

ALAN ALDA (NARRATION)

A few years ago, I was in southern Germany to meet a man whose life revolves around these. They're white storks.

At that time, Peter Berthold was having his first successes tracking the tremendous migration these birds make between Europe and Africa.

His interest was not just academic. White stork numbers are down by half in the last 50 years. Something's gone wrong somewhere.

PETER BERTHOLD

Normally they eat mice, frogs, also snails if available. But nowadays the situation of course has become very critical because you must know that due to this extensive farming, all this population have been cut down.

ALAN ALDA (NARRATION)

Peter gave me a memorable lesson in how to catch storks, bearing in mind that they have very large beaks.

ALAN ALDA

You grab 'em by the wings and then you grab them by the neck?

PETER BERTHOLD

If it's close to the fences and it's standing more or less, then it's best you first go to the neck, and then to the wing and then you take the whole bird. If it's flying against you, the best is you take it as you normally take your woman in the early morning and then you have it and so... no problem. That is the best you can do.

ALAN ALDA

I don't grab her by the beak, though, sorry.

ALAN ALDA (NARRATION)

Luckily when the big moment came, the stork chose Peter as its target.

PETER BERTHOLD

This was a big catch...

ALAN ALDA
Doesn't it fit kind of loosely?

PETER BERTHOLD
No, no, that's okay.

ALAN ALDA
I mean, if he like closes his mouth and dips his head, doesn't it come off and then he has a pretty good shot at your eye.

PETER BERTHOLD
Normally, no...(German)

ALAN ALDA
Aha, see, that's sort of what I anticipated. I'm not that dumb, I can...You want me to hold the beak?

PETER BERTHOLD
If you like, yeah, u-huh.

ALAN ALDA (NARRATION)

What we're doing is fitting a transmitter that can be tracked by satellite.

PETER BERTHOLD
So I think now we can release the bird...okay...very good. So will you please come in? Be careful with these steps here.

ALAN ALDA
Now once you release these storks you can track where they are at any give moment? You know wherever they are?

PETER BERTHOLD
Oh, yes. At least everyday we are able to have several locations. So I think this one is especially interesting...

ALAN ALDA (NARRATION)

The satellite tracking system can pinpoint each stork exactly, as it travels 1,000 miles from Europe to Africa.

ALAN ALDA
And where is this bird right now?

PETER BERTHOLD
This bird is right now, we can just see it here on the map. The bird is presently exactly in the area of the Bosphorus, this very critical area where

they have to cross here and not to go too far to have to cross the Black Sea, or in other parts of the Mediterranean.

ALAN ALDA (NARRATION)

When I visited, Peter had tracked about a dozen storks from Germany to Africa. Now he's followed 90, from all over Europe, in the all important eastern flyway.

Some storks go down through Spain, but most – about half a million – fly east across half a dozen countries.

They funnel down across Israel, then stop at a crucial bottleneck.

It's here, near the Egyptian desert town of Sharm el Sheik, at the tip of the Sinai.

On most days from mid-August to mid-October there can be thousands of birds waiting here.

Peter Berthold discovered that storks don't stop on their way down from Europe. They fly every day for 10 hours, 150 miles a day. But they have to stop at night, for the same reason they stop here.

Storks are soaring birds. They need the thermal air currents that rise off the land during the day. But at Sharm el Sheik they meet the Gulf of Suez. The sea doesn't produce thermals, so here the birds have to wait for favorable winds before making the twenty mile hop across the Gulf, and then continuing on into Sudan, Kenya, some even down to South Africa.

So Sharm el Sheik is a pretty important place for storks.

ADLI MESTIKAWY

This is a dead one, huh?

This is Susan Dinsmore and Adli Mestikawy. She's a volunteer and he's a Sharm el Sheik hotel owner.

SUSAN DINSMORE

This position usually means, it's the classic position for death from exhaustion. It just couldn't make it any farther. Let's see, let's check. Look at this keel--nothing, nothing.

ALAN ALDA (NARRATION)

The people are part of a small group of volunteers.

ADLI MESTIKAWY

He looks exhausted.

ALAN ALDA (NARRATION)

For the last ten years they've run a stork rescue center here during the migration.

JIM DINSMORE

It's a mature bird, huh?

SUSAN DINSMORE

Let's check his wings.

JIM DINSMORE

Legs are okay.

SUSAN DINSMORE

He's got a lot of external parasites.

JIM DINSMORE

Boy, he's very thin, too.

SUSAN DINSMORE

Wings are good.

JIM DINSMORE

Let's get him back to the clinic, re-hydrate him, get some food in him.

ALAN ALDA (NARRATION)

The rescue center's on the edge of town, on borrowed land, and supported by donations, mainly from tourists.

They treat about 400 birds a season, saving perhaps a third of them.

SUSAN DINSMORE

It's very thin.

ALAN ALDA (NARRATION)

Birds that simply need re-hydrating, like this one, have the best chance.

SUSAN DINSMORE

Okay. Okay. Nothing big. Okay let's just fill the bill so we don't stress him too much, because I think he's strong enough to swallow.

ALAN ALDA (NARRATION)

But the center's activities are controversial. In the belief that thin birds are not normal, they feed the waiting storks extensively.

Susan Dinsmore explains why.

SUSAN DINSMORE

They're not getting enough to eat before they come. But their migratory instinct is so great, that when it kicks in, they fly. And they're too weak to fly when they leave, but they come anyway. And so by the time they get here they're totally exhausted.

ALAN ALDA (NARRATION)

It's very hard to know if that idea is correct.

SUSAN DINSMORE

Okay, let him go into station 3, okay?

ALAN ALDA (NARRATION)

Peter Berthold says storks don't fatten up for the migration, and they don't stop to eat or drink along the way, because the lighter they are, the easier it is to soar up on thermals.

Nevertheless the center is feeding as much as 800 pounds a day of chicken carcasses – donated by local hotels – to thousands of storks that stop here.

Jim Dinsmore, a conservationist and veterinarian who with his wife Susan started the rescue center in 1990, has no qualms about helping out the storks on their epic journey.

JIM DINSMORE

This particular group of birds came, part of them, yesterday. The others are stragglers that have been here maybe 3 or 4 days. It's hard to say exactly where they came from. Some of the groups we have had earlier are from Estonia, some from Poland. Overall, the birds coming this year are in pretty bad shape. We feed them as much as we possibly can, but they'll stay four to five days and after that they're gone. We're taking the approach that what we need to do is offset the damage that's being done to the environment. These birds are losing their natural habitat, they're

losing their natural food chain, and all of this is due to human intervention. So we figure, if they're being damaged by human intervention, then we need to try to help them through human intervention.

ALAN ALDA (NARRATION)

There's no doubt Jim is right about the storks losing their natural habitat and food supply. Most of Western Europe is now intensively farmed. The little patches of wild places, like wetlands or undisturbed grassland, are disappearing – along with the frogs and mice the storks eat.

In fact only the former communist countries of Eastern Europe like Poland and Czechoslovakia, are still stork strongholds, because agriculture is less developed. That's changing rapidly now.

So there are fewer young storks being successfully raised in Europe, but we don't know if that means birds leave for the migration in poor condition

There's also no doubt that big changes are under way at Sharm el Sheik as well.

Once a tiny desert oasis, it's now becoming a big tourist destination, with great beaches, snorkeling and scuba.

Along with the tourists come sewage and garbage.

And that's prompted some storks to change their behavior, and stop here to eat.

20 years ago, when development began, the storks quickly discovered the town dump as a source of food.

The rescue center shot this home video there.

Every year there are many casualties, from ingested garbage and the nearby sewage ponds. It's partly what prompted the center to start feeding, away from the dump.

JIM DINSMORE

Storks aren't swimmers, they can't swim. So they become waterlogged and then they sink -- and when they sink they drown.

ALAN ALDA (NARRATION)

Open incineration pits are another hazard.

JIM DINSMORE

Burns on both feet?

SUSAN DINSMORE

Yeah. And they're getting worse. And he's eating. You know, he's still eating on his own, no problem.

JIM DINSMORE

Well, we still have a chance with this one foot here.

ALAN ALDA (NARRATION)

This kind of devoted care is unnatural for the storks, and feeding's not normal during migration. But it doesn't matter, says Jim -- we've got to act now, or there won't be any wildlife left to behave naturally.

JIM DINSMORE

There you go, big guy. We're a very small, small part of what I hope will be a big solution at some point in time. But people need to become more aware of the environmental situation. If we wait until everything is almost extinct, wait until there are only 200 storks like there are only 200 mountain gorillas now then, yeah, there'll be a lot of attention given. But then usually it's too damn late.

ALAN ALDA (NARRATION)

After a few days of hotel chicken, groups of storks decide conditions are right and head up into the thermals. They need to gain enough height to glide across the Gulf into Africa.

There the wintering grounds are under pressure, too. Long distance travelers like these need their wild places stretched across the face of the globe.

I'll let Adli Mestikawy, the hotel owner from Sharm el Sheik, have the last word.

ADLI MESTIKAWY

I feel like I'm sending a message to everybody that birds and wildlife are us, are part of us. We cannot just live in a world where we step over nature and wildlife without thinking that we are part of it.