Arizona's Bald Eagle Management Program

Arizona Game and Fish Department
Nongame and Endangered Wildlife Program

Why do we need to manage the bald eagle population in Arizona?

- Recreation pressures are highest when the bald eagles are breeding during the spring.
- Increasing demand for water and water-related projects.
- Limited law enforcement personnel to offer protection to the breeding attempts.
- Cottonwoods trees are not regenerating in breeding areas restrictive to their use.
- Fatal occurrences of mercury discovered in bald eagle eggs
- Loss of native fish causing reproductive declines.
- High mortality rates in breeding adults.
- Evidence pointing towards an isolated and inbreeding population.

- Recreation pressures increase during the spring when bald eagle are in the middle of their breeding attempts.
- Human populations, recreation pressures, and development are increasing near our limited riparian systems.
- Closures and nestwatch contractors are becoming a necessity to minimize human disturbances and successfully produce young.
- Flood events and over 100 years of cattle overgrazing have eliminated large riparian tree regeneration.
- Mercury has been found statewide, and in some cases, over three times the toxic threshold for bald eagle eggs.
- Invasive non-native fish species have taken over in unregulated rivers causing reproductive declines.
- Mortality rates are equal to our recruitment rates, and are abnormally high compared to the rest of the nation.
- We have found 99.9% of our breeding adults were hatched in Arizona, with four cases of inbreeding.

History of Bald Eagles in North America

- First known records of species
  - Remains found in a Colorado Cave
  - Carbon dated to 670,000 to 780,000 years old
  - Estimated 250,000 to 500,000 bald eagles existed in North America pre-European settlement
- Late 1800's declines in bald eagle populations
  - Decline in prey base
  - Poisoning
  - Humans
  - DDT

Oldest Records and Population Numbers

- Remains of a bald eagle identified in a Colorado cave aged 670,000 to 780,000 years old.
- Pre-European settlement, an estimated 250,000 to 500,000 bald eagles occupied North America.

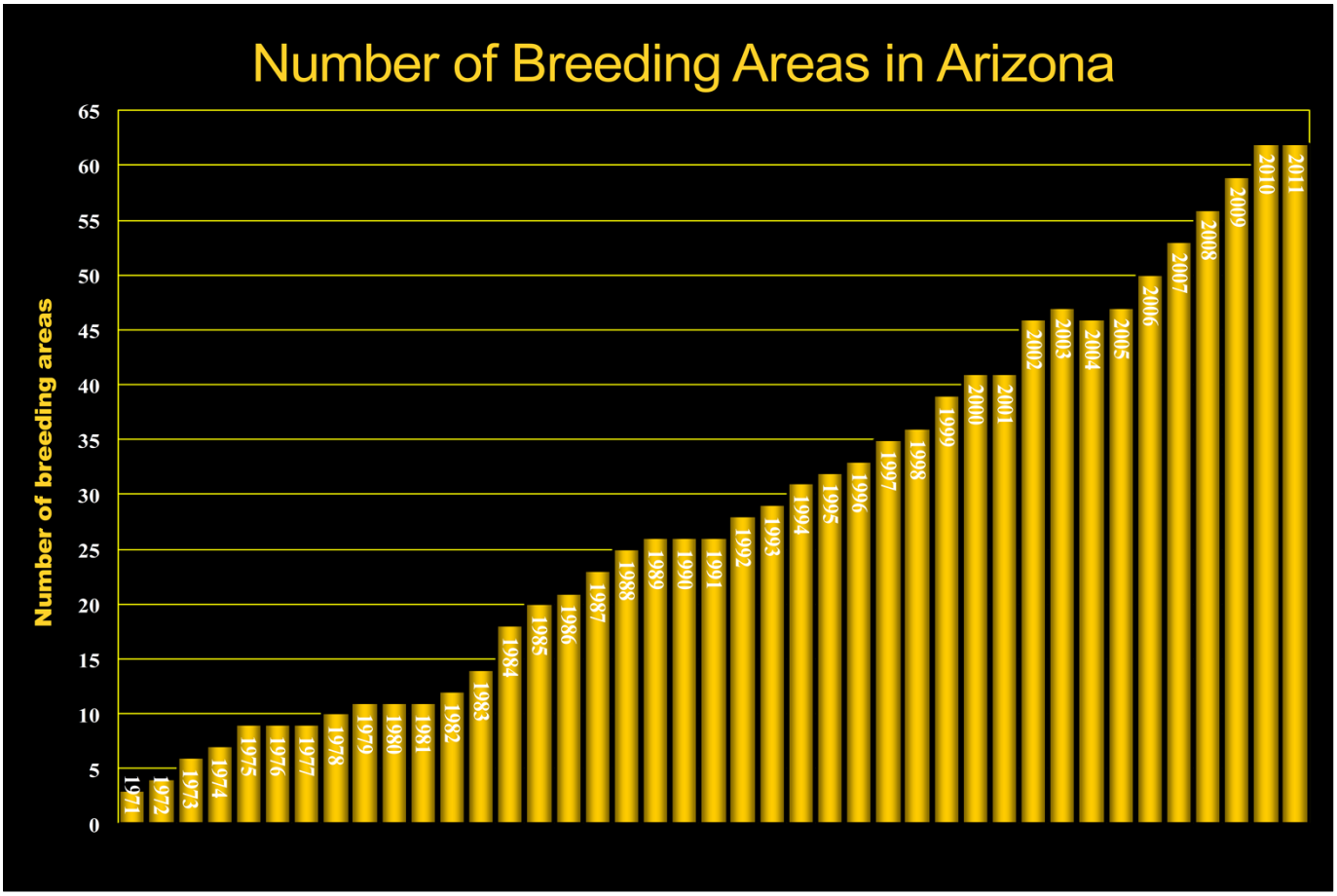
Declines in bald eagle populations.

Mid to Late 1800s

- Reduction in prey base through loss of bison and waterfowl populations.
- Poisoning of large carcasses to control livestock predators.
- Expansion of human population and deforestation.
- Collected for feathers and trophies.

1940s

- DDT use widespread to control mosquitoes and as a crop pesticide.
- DDT's principal metabolite DDE impaired normal calcification of eggs



- The first documented occurrence of bald eagles breeding in Arizona was at Stoneman Lake, south of Flagstaff, in the 1890s.
- In the 1930s, the first documentation of bald eagles breeding in desert habitat occurred during the construction of Bartlett and Stewart Mountain Dams.
- In 1971, due to concern of the declining populations nationwide, U.S. Fish and Wildlife Service personnel began monitoring the bald eagle populations.
- In 1978, when the species was listed as Endangered under the Endangered Species Act, Arizona only had 11 known breeding areas. Most of those were found in the easily accessible locations along the Salt and Verde Rivers.
- AGFD began our nest survey effort in 1985, utilizing helicopters to access the remote canyons of Arizona's watersheds.
- As a result of a biological opinion, in 1987 the U.S. Bureau of Reclamation funded a multi-million dollar project to study the ecology of bald eagles in Arizona.
- Due to the efforts of this study, and the nest survey, Arizona had documented 36 breeding areas when the U.S. Fish and Wildlife Service downlisted the species to Threatened in 1995 across all recovery regions.
- In 2007, the U.S. Fish and Wildlife Service delisted the species nationwide. In Arizona, the listing status of the population of desert-nesting bald eagles is currently (2011) being contested in court.

Arizona Bald Eagle Management Program

Projects and Responsibilities

- Southwestern Bald Eagle Management Committee
- Nestwatch Program
- Nest Search
- Visual Identification and Banding Project
- Winter Count
- Occupancy and Reproductive Assessment Flights
- Organochlorine, Heavy Metals and Parasite Analysis

- An oversight committee, and six individual projects are coordinated by the Arizona Bald Eagle Management Program.
- Each project identifies, and collects data on, a specific demographic parameter. This data is crucial to managing, maintaining, and enhancing Arizona bald eagle populations.

Southwestern Bald Eagle Management Committee

- Arizona Game and Fish Department – Chair
- Arizona Department of Transportation
- Arizona Public Service
- Arizona State Parks
- Arizona Army National Guard
- American Eagle Research Institute
- Army Corps of Engineers
- Bureau of Indian Affairs
- Bureau of Land Management
- Bureau of Reclamation
- Fort McDowell Yavapai Nation
- Freeport McMoRan
- Gila River Indian Community
- GeoMarine Incorporated
- The Hopi Tribe
- Maricopa County Parks and Recreation Department
- National Park Service
- Navajo Nation
- Phelps Dodge Inc.
- Salt River Pima-Maricopa Indian Community

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- Salt River Project
- San Carlos Apache Tribe
- Tonto Apache Tribe
- U.S. Department of Defense
- U.S. Fish and Wildlife Service
- U.S. Forest Service
- White Mountain Apache Tribe

- As more bald eagle breeding areas were found, oversight and coordination of bald eagle management became difficult. The species occurred on many different lands and under the jurisdiction of many agencies.
- In an effort to increase coordination and communication for the best interest of the bald eagle, the Southwest Bald Eagle Management Committee was formed in 1984.
- As of 2011, there were 26 members of the Southwestern Bald Eagle Management Committee of various federal, state, and local agencies, Native American Tribes, and private organizations.
- The main goal is to continue interagency cooperation, and to utilize the information acquired to ensure the long-term conservation of the bald eagle.

Arizona Bald Eagle Nestwatch Program

- Goals
  - Education
  - Data Collection
  - Conservation
- Personnel
  - 20 contractors
  - 10 – 15 breeding areas
  - Stationed at high recreational use areas.

- In 1978, the Arizona Bald Eagle Nestwatch Program began when Forest Service and Maricopa Audubon Society volunteers monitored a single breeding area below Bartlett Lake.
- Soon this effort expanded to more breeding areas. The U.S. Fish and Wildlife Service assumed coordination of the program, and expanded its scope. In 1991, the U.S. Fish and Wildlife Service passed the lead for the program to the Arizona Game and Fish Department.

Goals

- Education - Contact and educate the public about breeding bald eagles.
- Data Collection - Record bald eagle natural history, habitat use, and human activity.
- Conservation - Identify potential problems and alert the Rescue Team to life threatening emergencies.

Personnel

- 20 contractors - Contracted annually from February to June, they spend 10 days at a time at the breeding areas.
- 10 – 15 breeding areas - The ABENWP monitors 10-15 breeding areas during one breeding season.
- Stationed at high recreational use areas - Most often, these are closest to the metropolitan Phoenix area.

- Annually during the first week of February, 20 individuals from across the nation migrate to Arizona to take part in the Arizona Bald Eagle Nestwatch Program.
- We hold two meetings at the beginning of the season to help educate the new contractors on their job responsibilities, safety, and data collection techniques. Additional meetings are held monthly through the season.
- Most, just out of college, will use our program to refine their skills and launch their careers into wildlife conservation.

- After orientation, the nestwatchers will be spread across the state to the bald eagle breeding areas with the highest recreation pressures.
- Stationed on-site for ten days at a time, nestwatchers collect a variety data on the bald eagles nesting behavior, prey base, nestling development, and habitat use.
- At the end of the breeding attempt, usually mid-May, these teams will compile a report summarizing the data they have collected.
- An important part of their jobs is to talk with people about bald eagles; nestwatchers spread the word and help with viewing opportunities.

Arizona Bald Eagle Breeding Area Closures

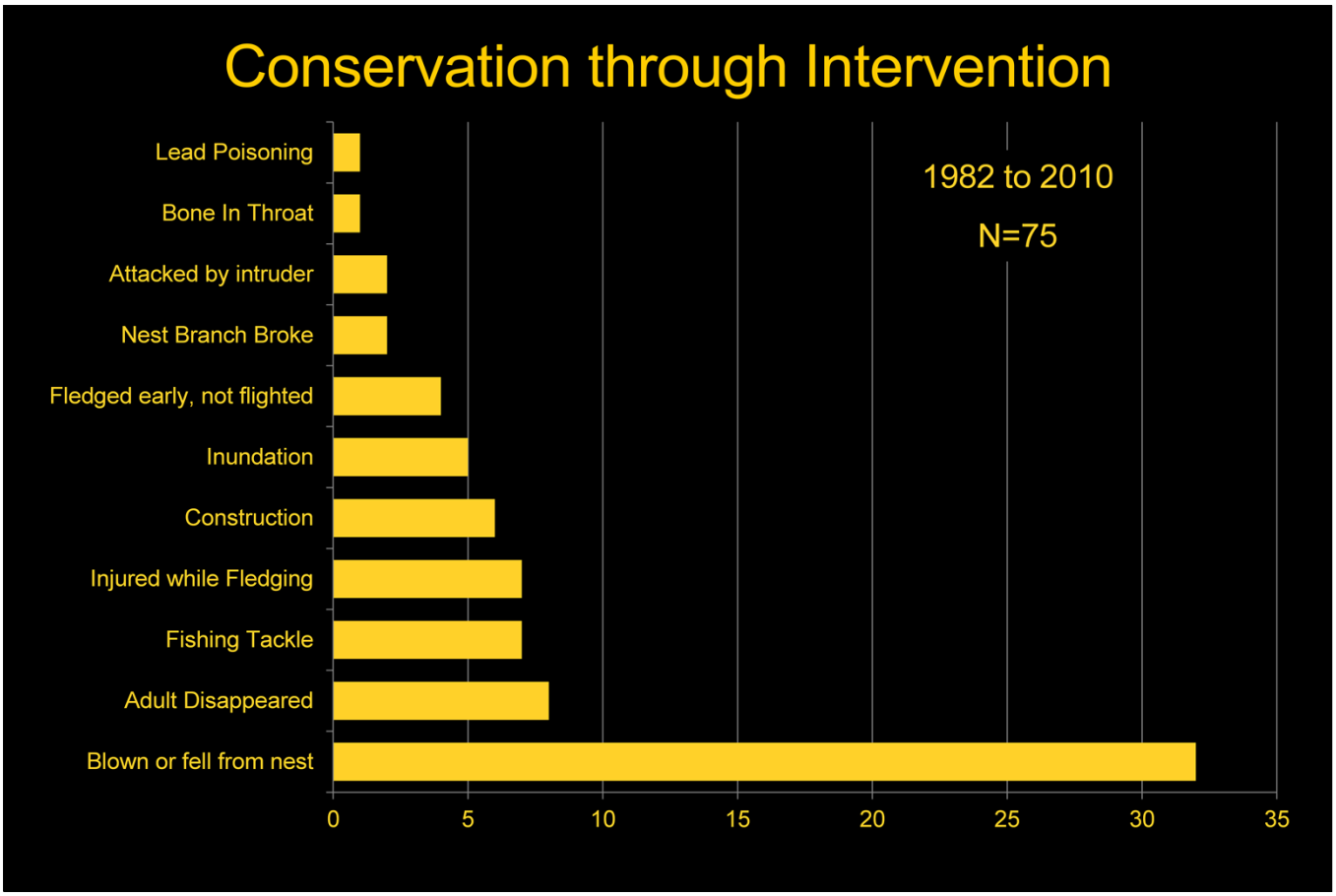
- Some of the breeding areas have seasonal closures restricting access to the sensitive nest area by human activity.
- Statewide, Arizona has about 19 of these closures, which may include restrictions on land and/or waterways.
- The Arizona Bald Eagle Nestwatch Program helps enforce these closures by educating the recreating public about bald eagles in the area.

- More often than not, most people do not know when they are entering a bald eagle breeding area. Like these rafters floating down the river.
- But if these rafters were to stop and camp for the evening, the nestwatchers would talk to the individuals, educate them about bald eagles and their sensitivity during the breeding cycle, and ask them to move away from the nest area.
- Most people are respectful, and will happily avoid causing any disturbance to the breeding attempt.

- However, a very minor portion of the public are less respectful.
- These individuals were photographed throwing rocks into the bald eagle nest, and 300 feet below into the river (both of which are a felony).
- Luckily, the bald eagles were nesting in an alternate nest approximately 500 feet upstream.
- The nestwatchers contacted these individuals soon after this incident, educated them about the bald eagles, and helped direct them out of the closure.

- The Arizona Bald Eagle Nestwatch Program collects data on all kinds of human recreation within the breeding area.
- This data is then used by the Southwestern Bald Eagle Management Committee to proactively address, and impose management to counteract, problems and threats which may impede successful breeding attempts.
- For example, as a result of low flying aircraft, (such as this one who just passed over an active bald eagle nest flying 50 feet above the ground), the Southwestern Bald Eagle Management Committee, with help from the FAA, was able to designate a 2000 foot advisory above all bald eagle breeding areas.

- The common goal is to protect the breeding attempt.
- There are certain stages of the breeding cycle where, just flushing an adult from a nest, may cause the breeding attempt to fail.



- One of the bonuses to having the nestwatchers constantly monitor the breeding attempt, is the ability to help rescue individual nestlings, and adult bald eagles, in life-threatening situations.
- Most of the rescues involve replacing nestlings that have left the nest before they can fly, and rehabilitating those that broke a bone in the process. But others can entail supplementing food to one adult for months when the other disappears, or raising nestlings in incubators and cross-fostering those who lost their nest to flood waters.

- In preparation for their first flight, nestlings often grab hold of a branch or a stick in the nest and flap feverishly to exercise their wings.
- These sticks and branches can break, and the nestling plummets to the ground. On the ground the nestlings are susceptible to predators like coyotes, bobcats, and mountain lions.
- This nestling fell from the nest three times before we discovered it had cataracts and was blind.

- Normally, the rescue team will arrive on site within two hours, and recover the nestling.
- However, bald eagle nestlings on the ground can be very mobile and secretive.
- It can take hours to locate an uninjured nestling without the constant observations of the nestwatchers.

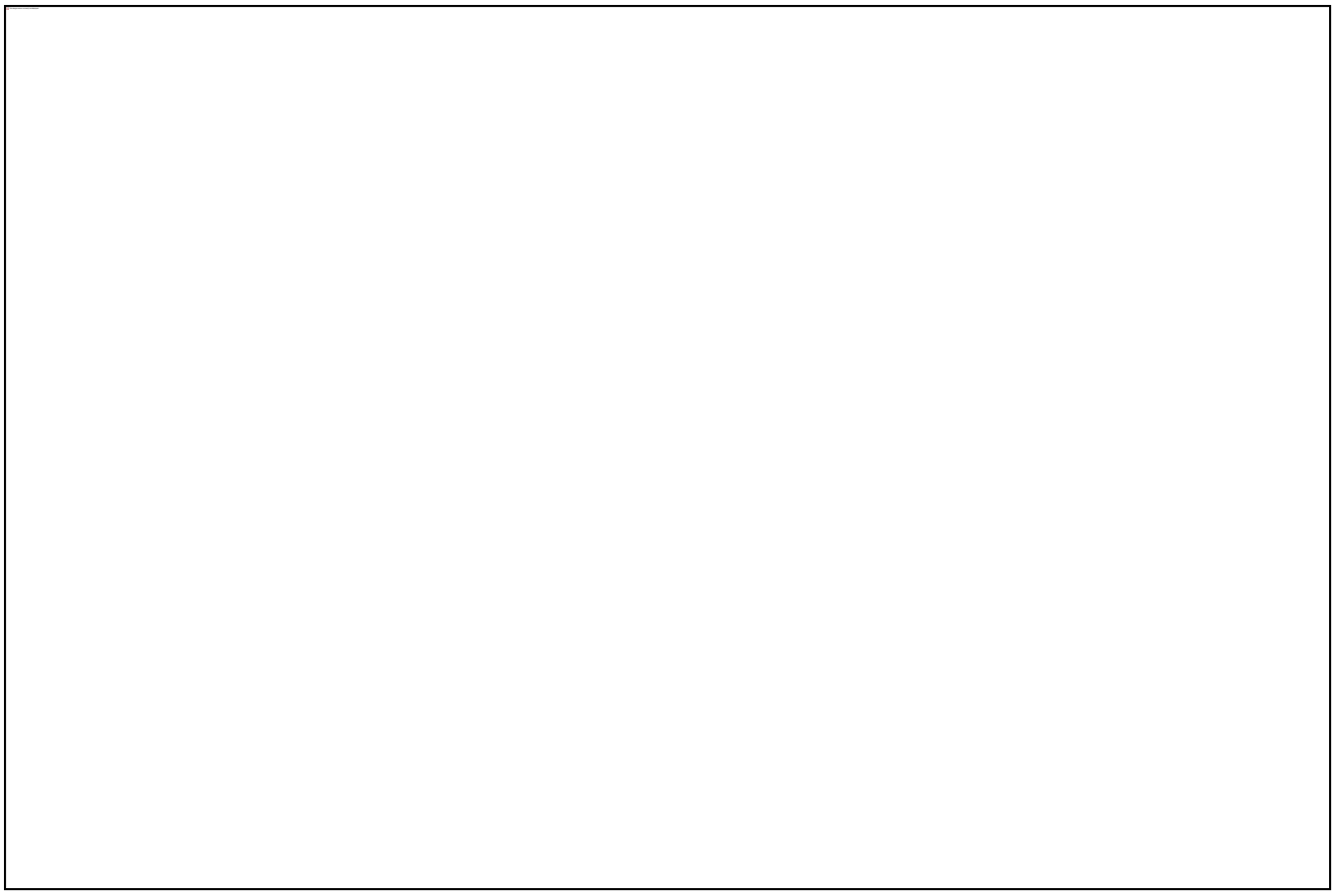
- If the nestling has been out of the nest for a long period, or it has not been fed in awhile, we will bring it back to health by simply offering food and hydrating.
- Hydrating is accomplished by placing a soft rubber tube down the nestlings throat, and pushing water through a large syringe.

- If a fallen nestling is deemed to be in good health, we simply return them to the nest, and bid a fond farewell.

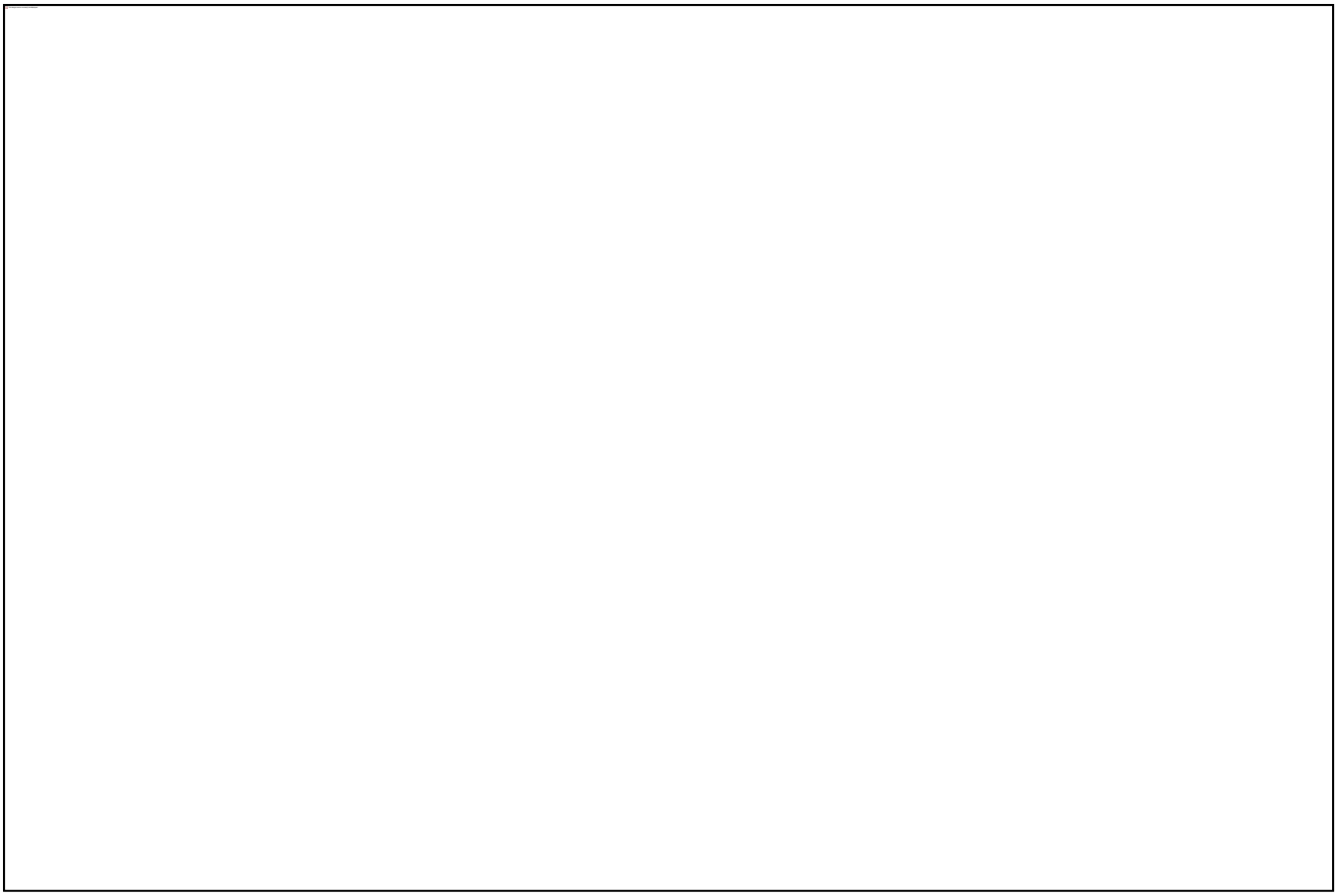
- However, falling from a cliff or tree nest over 50 feet off the ground can have its consequences.
- Nestlings with broken bones or other obvious injuries are transferred to Liberty Wildlife Rehabilitation.
- At the rehab facility, their injuries will be mended and braced. They will be fattened up, exercised, and released back into their natal area.
- This particular nestling fell over 100 feet to the ground. We believe it tried to grab some branches on the way down and hyper extended its tarsal ligament (in layman's terms, bent its knee backwards).

- But often our rescue missions become more complex and involve more coordination.
- Living in the desert southwest, a small rainstorm can have drastic effects to our watersheds and the animals that occupy those areas.
- Bald eagles that nest in trees similar to the one on the left, can find themselves in precarious situations.

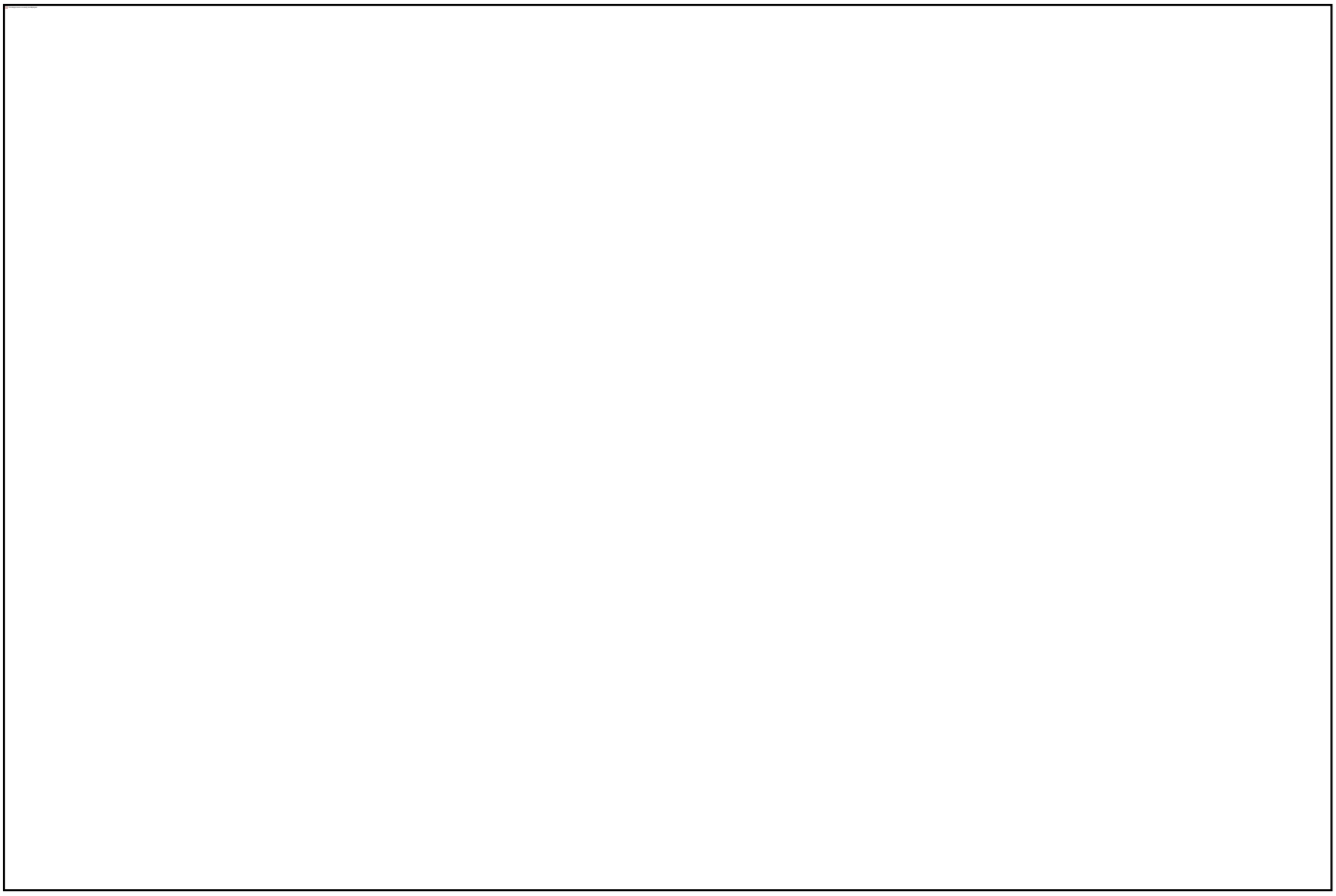
- Through the help of the Southwestern Bald Eagle Management Committee members, we have many resources on hand to help us combat those life-threatening situations.
- In areas that are difficult to access, and in situations where time may be limiting, small planes, helicopters, powerboats help eliminate the logistical concerns behind a rescue.



- Especially at times when the water levels are increasing 16 inches per hour, the nest is six feet out of water, and its 5 o'clock in the afternoon.
- This particular nest on Alamo Lake contained two bald eagle eggs.
- We recovered the eggs, one hatched in an incubator at The Phoenix Zoo, and was raised in an imprint free environment until it was four weeks old.



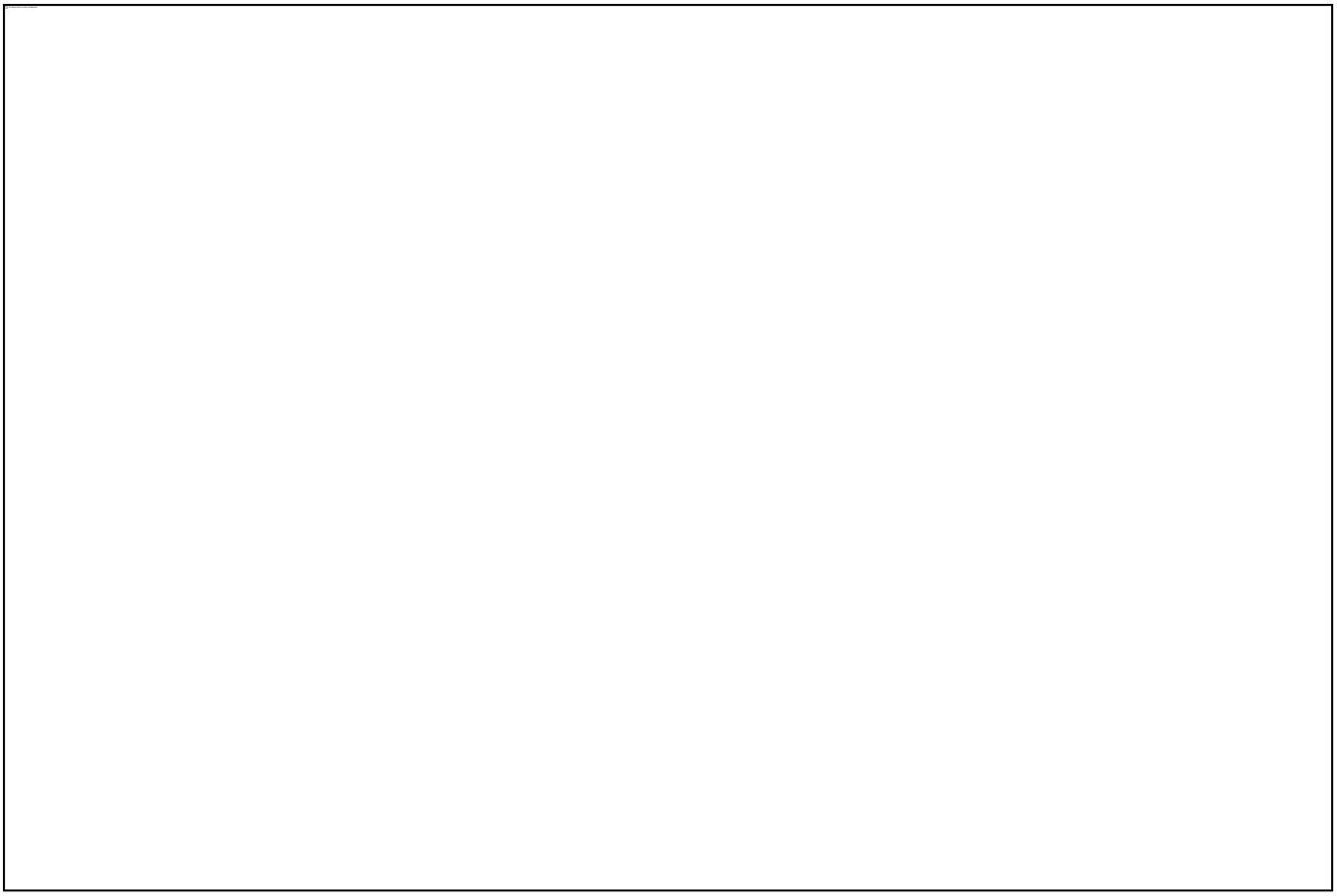
- We then fostered the nestling into an active nest downstream, with a nestling who was the same age.
- Both the wild, and zoo raised nestling fledged within hours of each other.



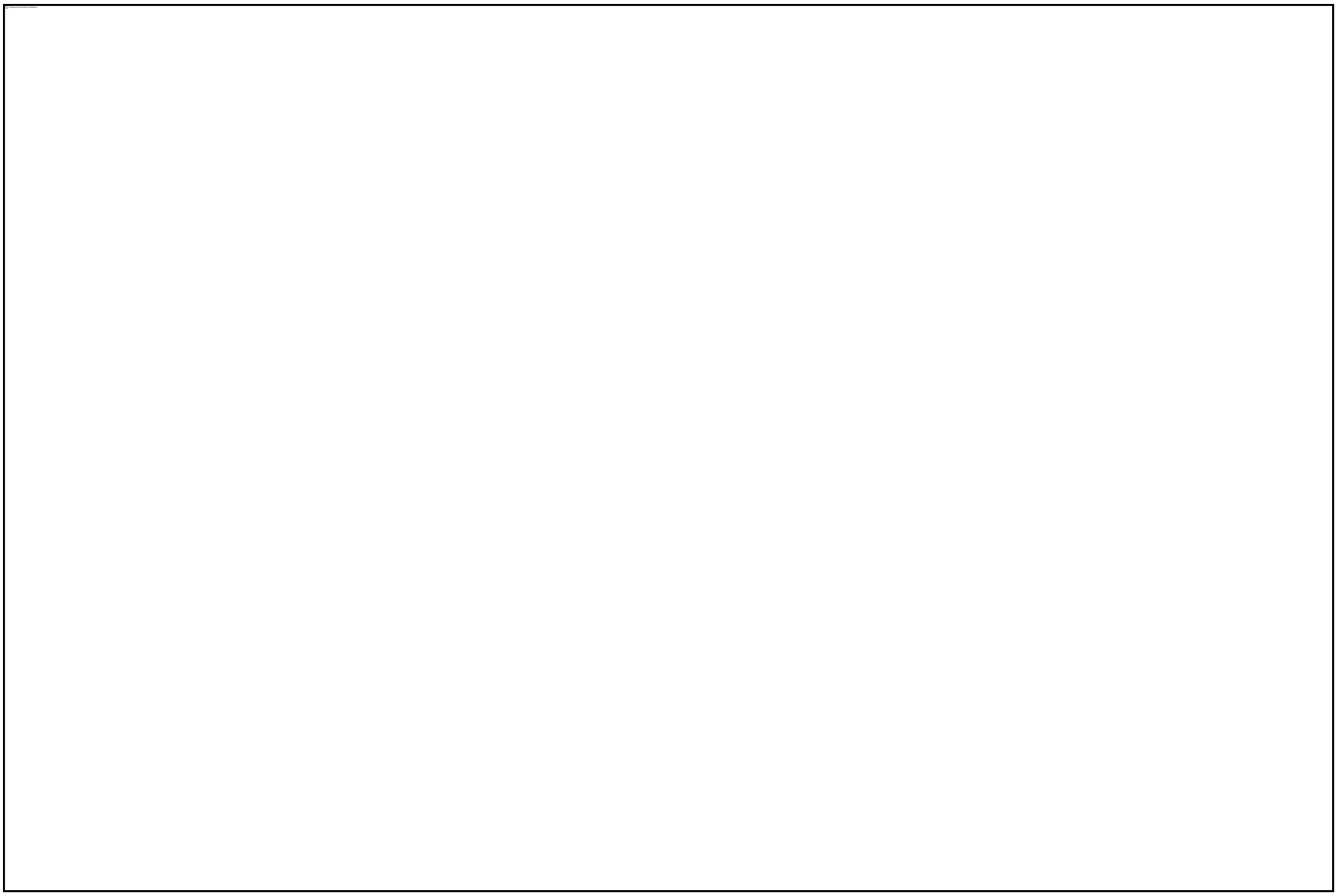
•Unfortunately, not all of our rescues are from natural causes.

•Monofilament and fishing tackle has been found in the nests, or entangling nestlings, in one half of the breeding areas in Arizona.

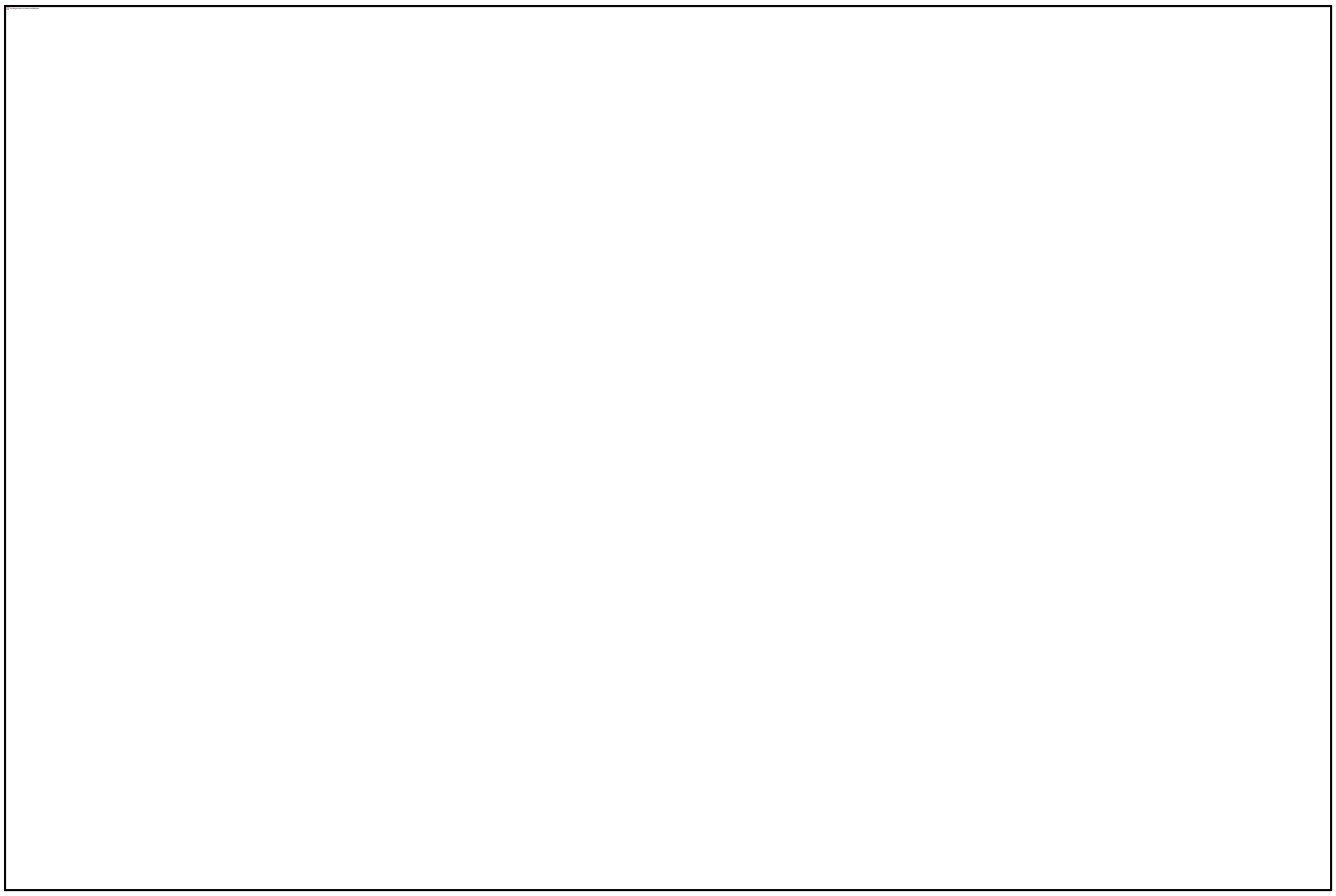
•Usually, bald eagles encounter monofilament when they capture of fish that have broken the line. These fish are brought to the nest to feed the nestlings, where monofilament can get caught around their legs, and tie them to the nest.



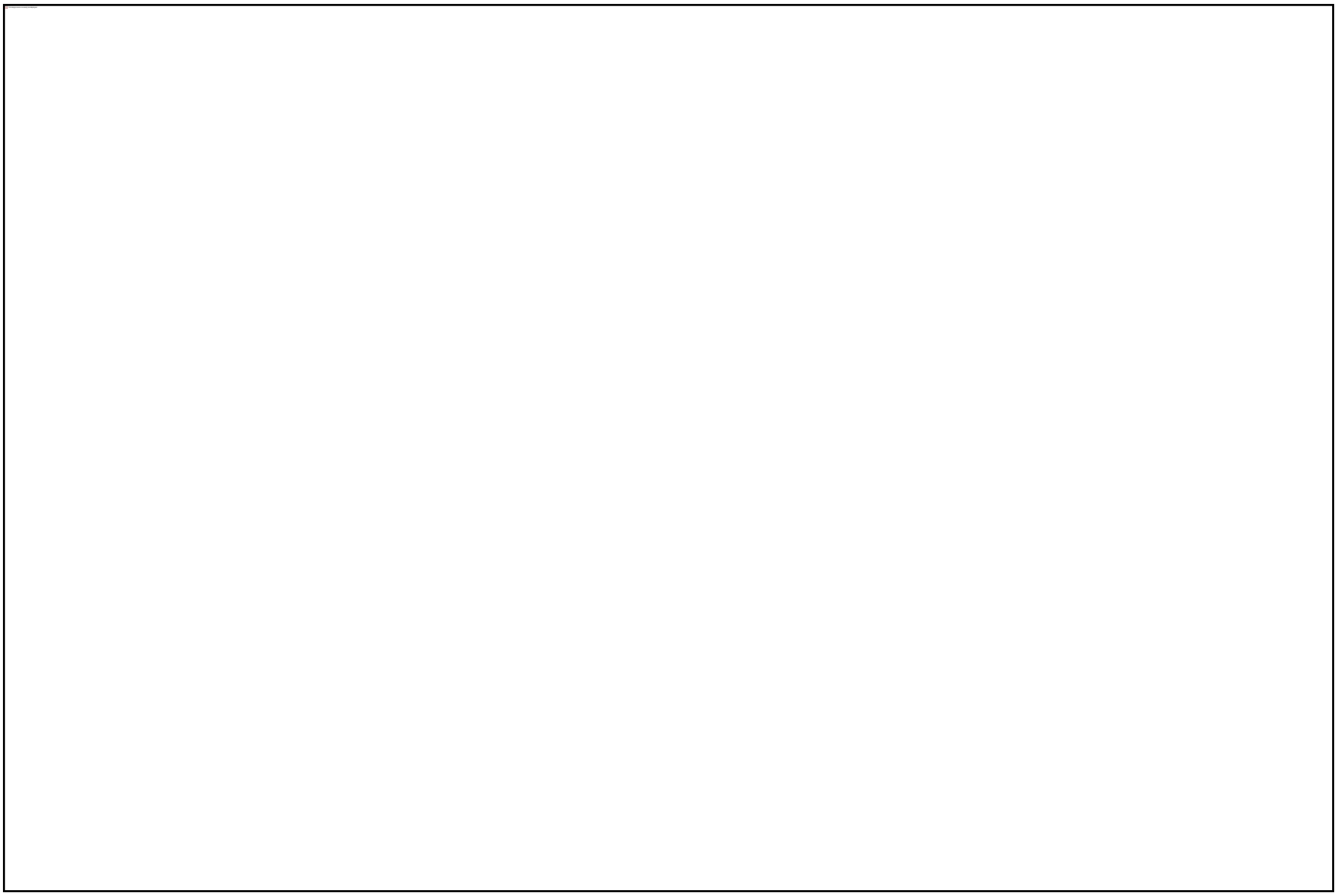
- At the orientation, we train nestwatch personnel on the signs of, and the procedures to follow, if they suspect monofilament entanglement.
- Through their help, we are able to eliminate the problem before it escalates into a life-threatening situation.
- This nestling (left) became entangled after the adults brought in a dead fish with the fishing line trailing. After recovering the nestling and removing the line, we discovered that the line was attached to the root of a tree, and likely abandoned.



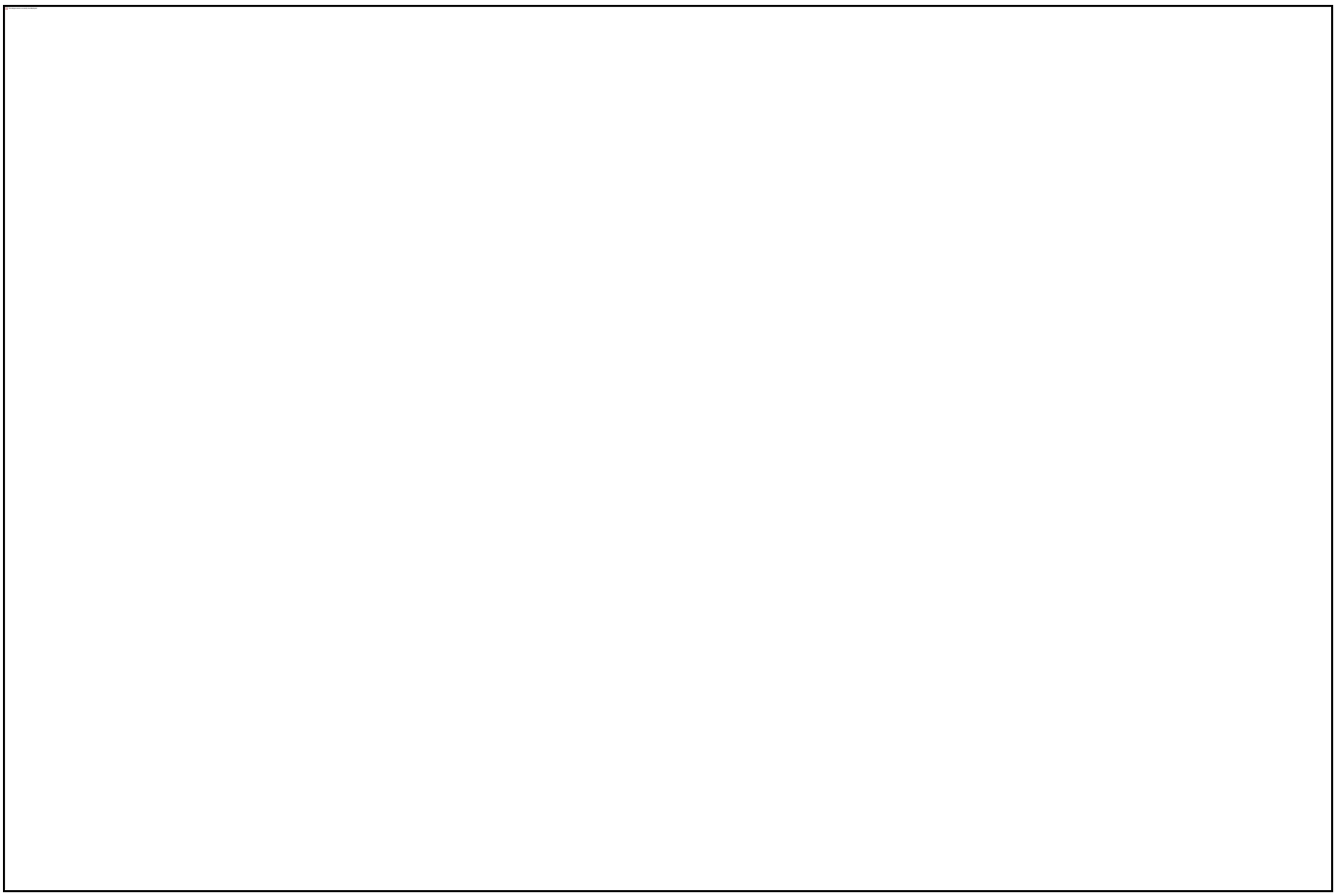
- But not all fishing tackle is as obvious as monofilament trailing from a fish.
- During banding, we discovered this nestling had a hook in its toe. The small portion you see is the eye of the hook, and the remaining curved portion, with the barb, is inside the toe.



- And without constant monitoring through the nestwatch program, monofilament situations can become more serious.
- This nestling had a hook in its mouth, the trailing fishing line went around his head and through his mouth again, severing the bottom of its tongue. It continued around its body and legs, was caught in the nest and re-emerged around the legs of its sibling.



- And more serious still, nestlings can die from being entangled in monofilament. This nestling is one of two such cases.
- At a unmonitored site, monofilament had wrapped around this nestling's neck (left), preventing it from swallowing food. The nestling died of starvation.
- Another nestling was found dead below its nest (right) with a large hook in its leg and monofilament wrapped around its foot. Although the cause of death was not confirmed, the hook and line was the most likely culprit.



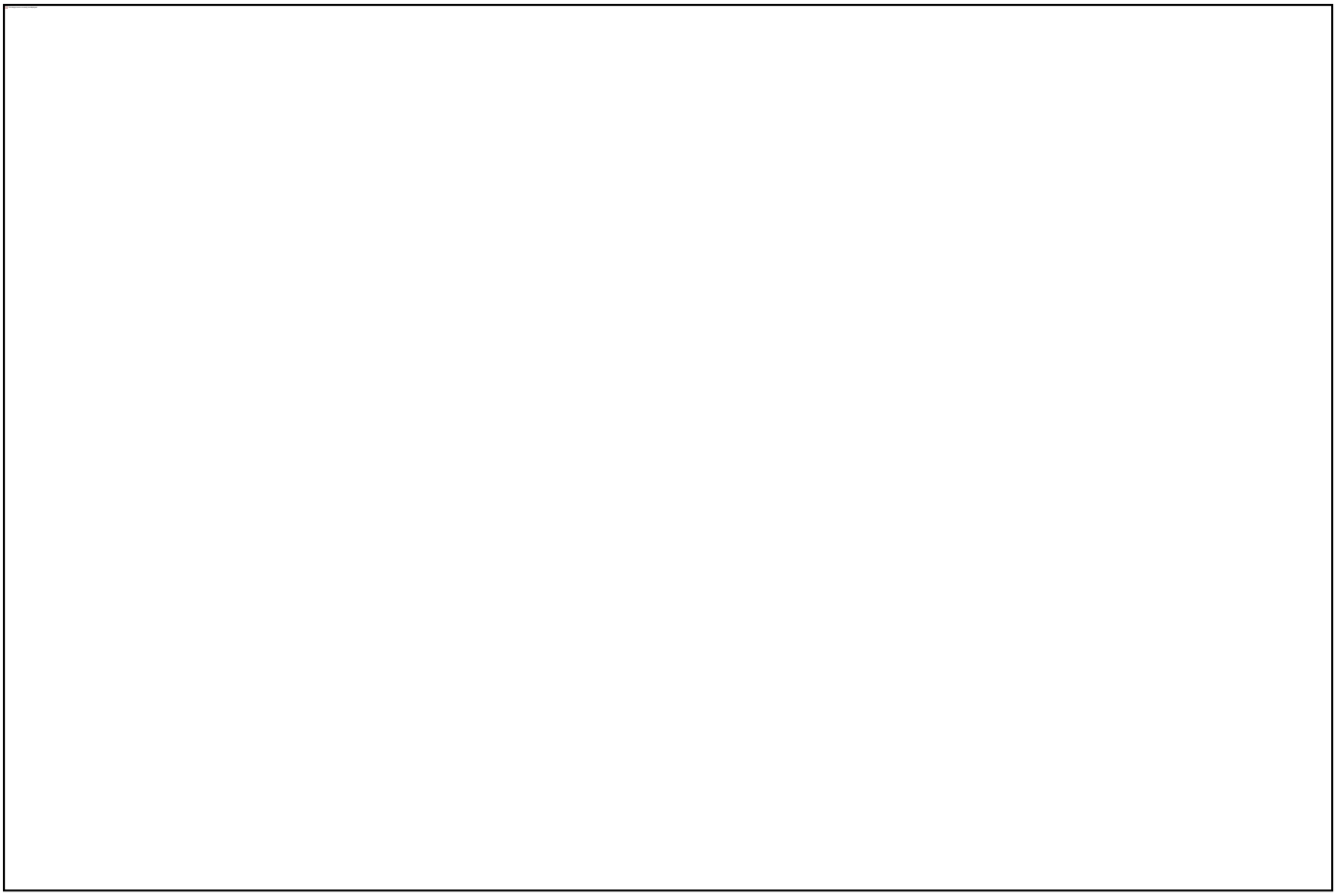
- Arizona’s rugged terrain and deep canyons was one of the reasons so few bald eagle breeding areas were known in the 1970s.
- After intensive surveys and through the aid of helicopters, we found that bald eagles had a wider statewide distribution than previously thought.
- As a result of these surveys, we were able to meet and exceed the goals of the 1982 Southwestern Region Recovery Plan within three years.

Visual Identification and Banding Project

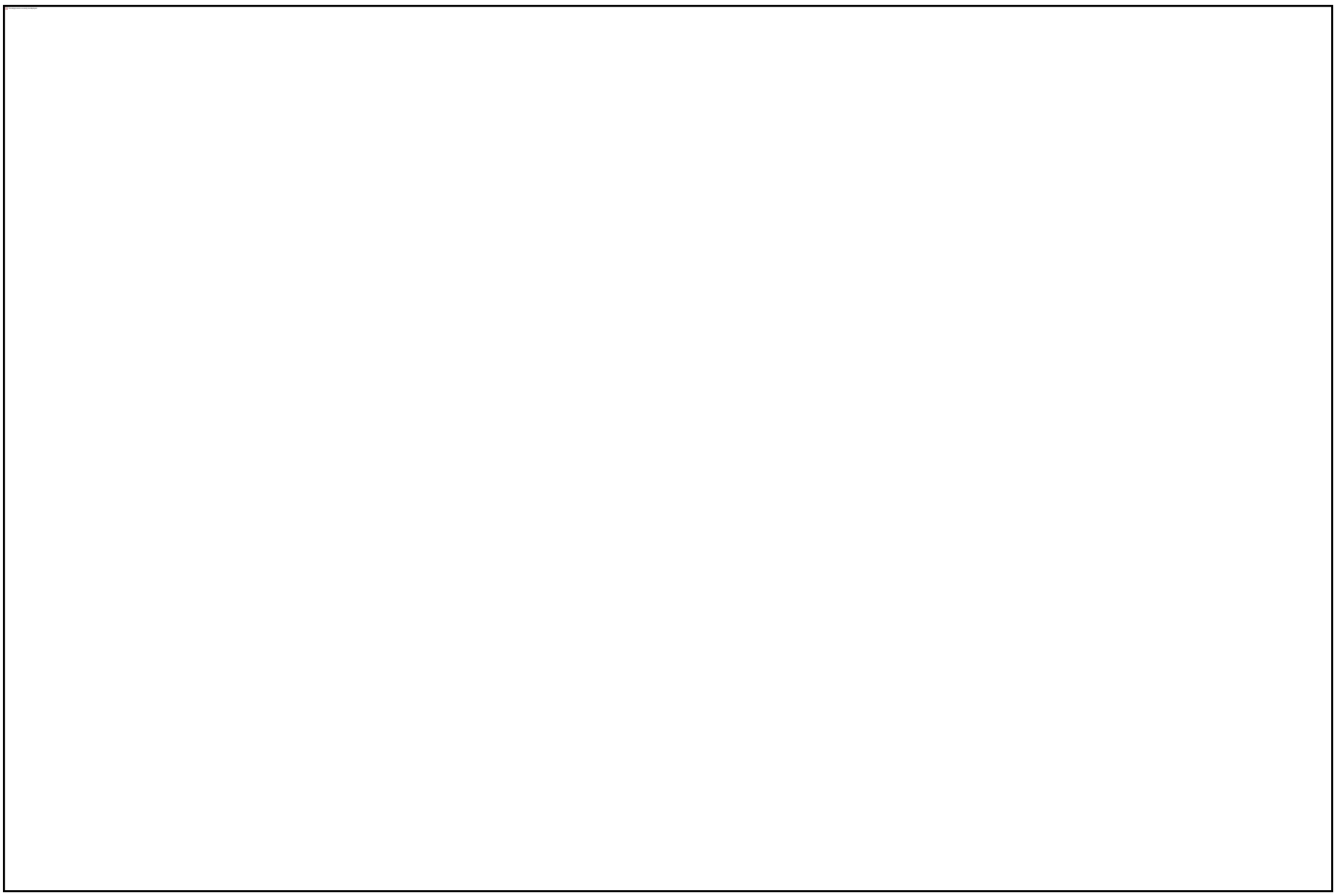
Project Goals and Responsibilities

- Determine natal origin of breeding adults.
- Distribution of Arizona bald eagles throughout their breeding range.
- Replacements, immigration, and emigration into the breeding population.
- Movements within Arizona's population.
- Occurrence of inbreeding and level of isolation in Arizona.
- Age of first breeding, longevity and tenure within a pair.
- Evidence for or against a distinct vertebrate population classification.

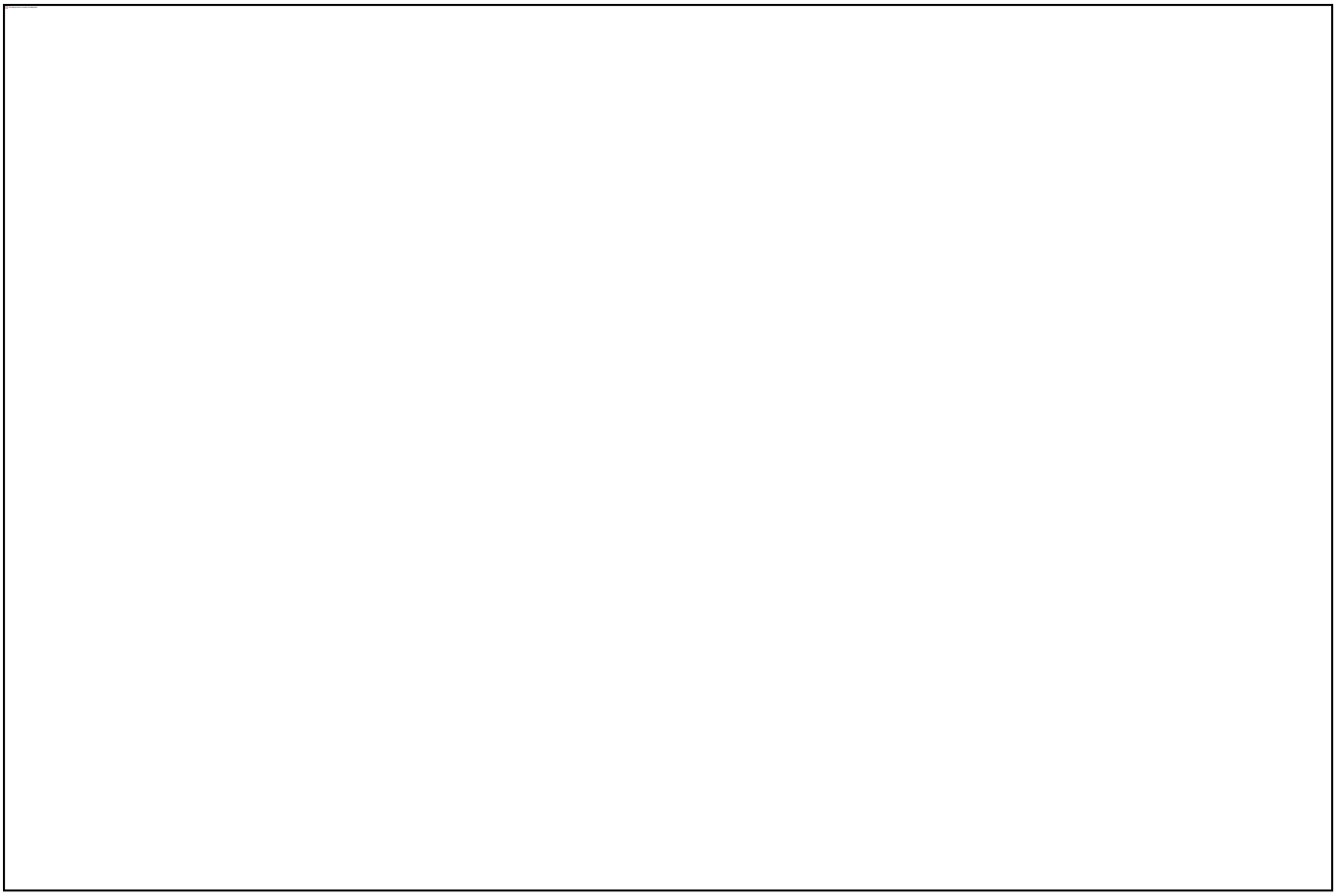
- In 1987, researchers began a comprehensive program to assess current population dynamics, and viability in the future.
- As a requirement of this two stage project, we must band every nestling hatched, and identify every adult bald eagle breeding in Arizona.



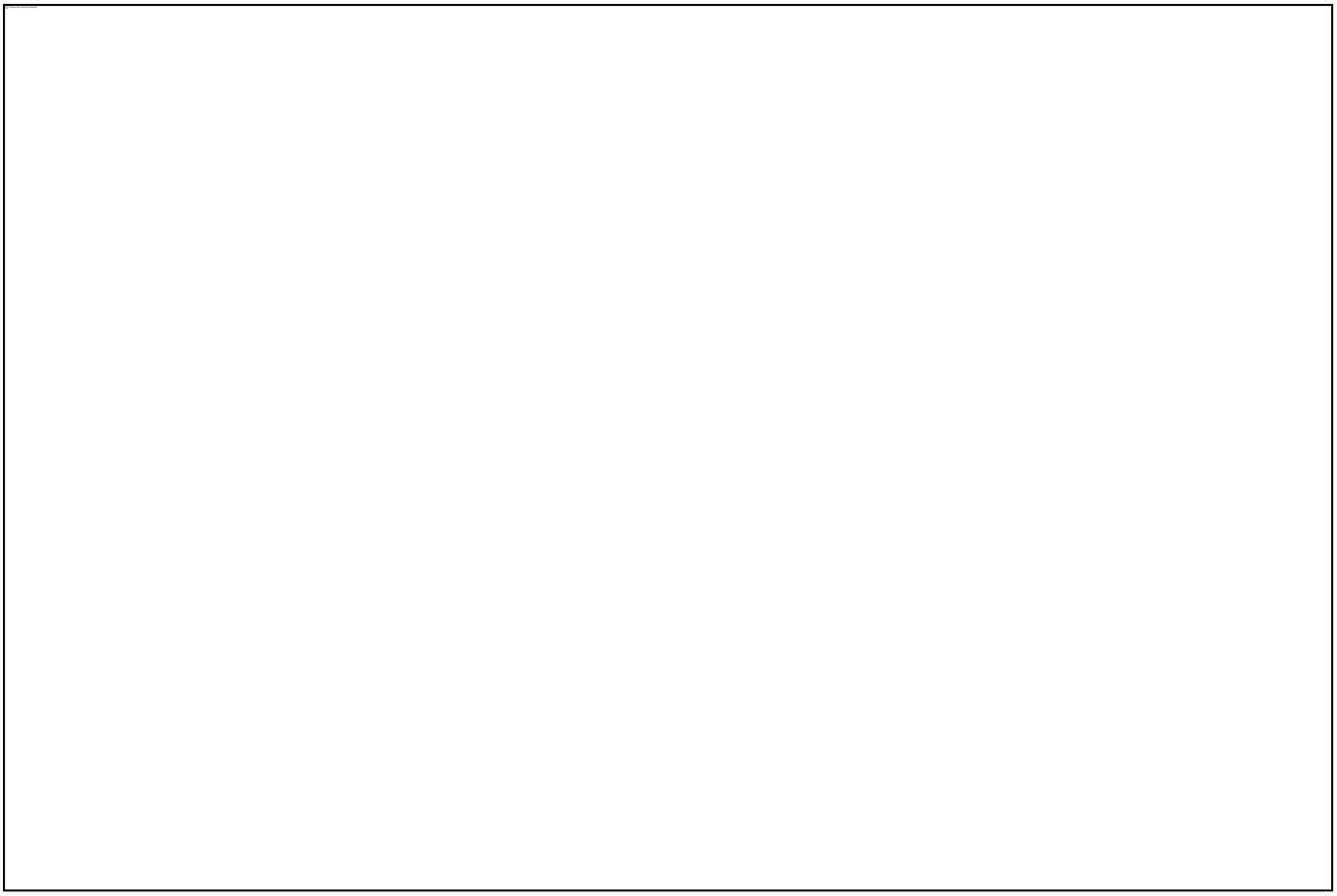
- But meeting the first requirement of this project can be difficult. In order to band the nestlings, we must first gain access to the nests.
- Bald eagles utilized a variety of different nesting substrates, the most common being large riparian trees.
- These come in two forms, alive (left) and dead (right).



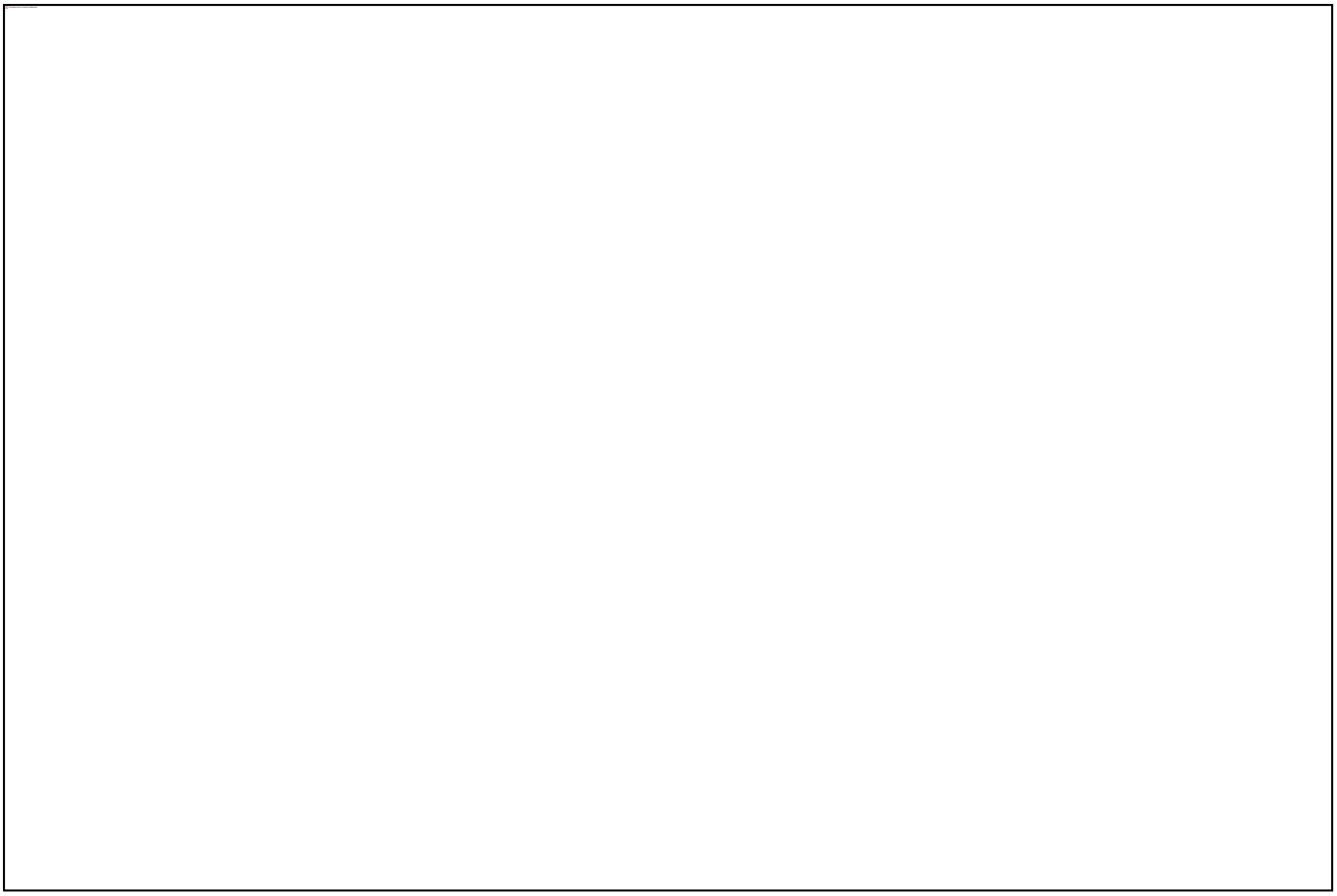
- As the number of large riparian trees decreases, bald eagles began to place their nests in locations to risky to climb. Such as the snag top of this tree.
- By using Salt River Project's bucket truck, we eliminate the possibility of breaking the nest branch with a climbers weight.



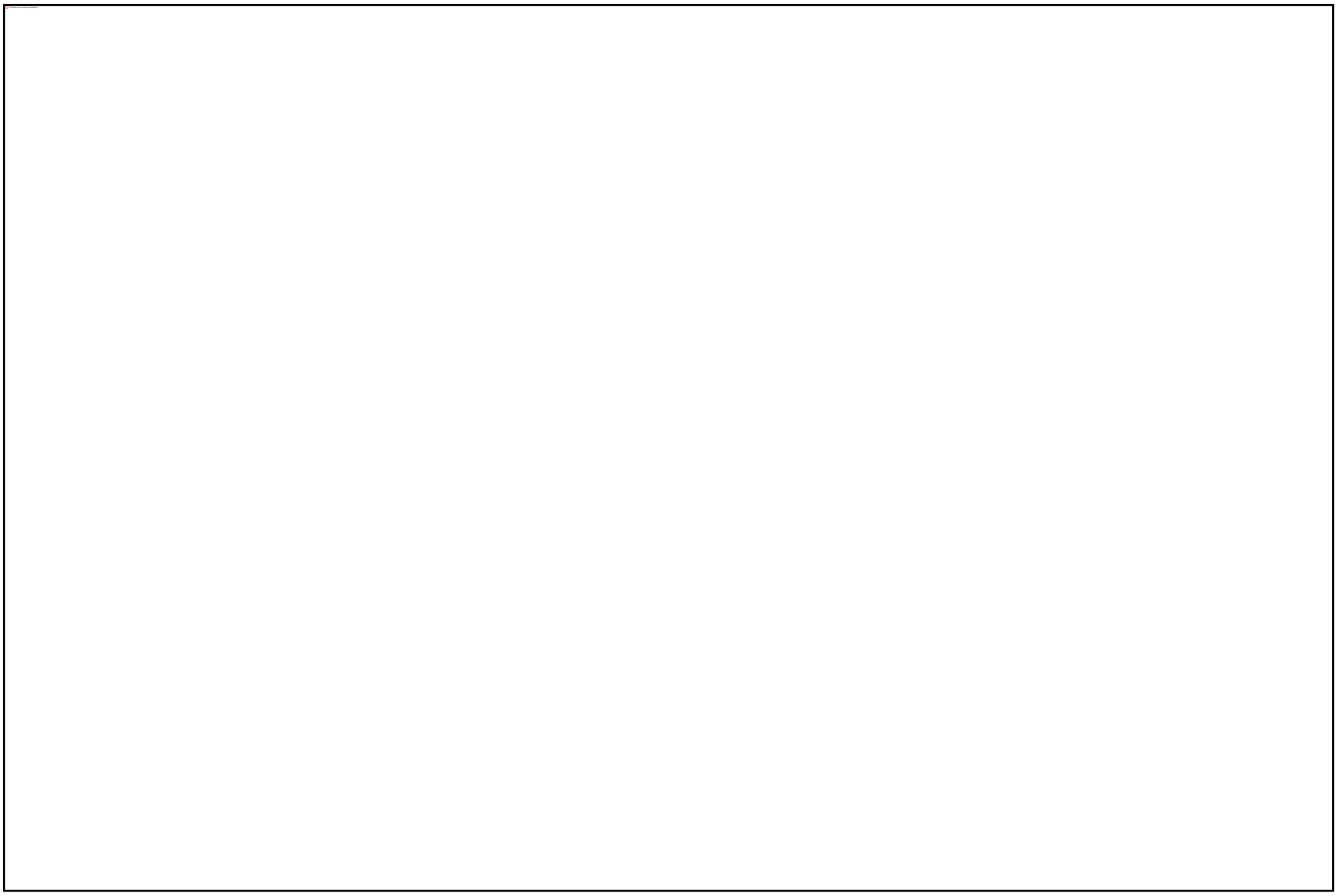
- In addition to large riparian trees, bald eagles can also build their nests in large pine trees.
- This slide shows one of our nests in the White Mountains. For reference, the man pictured at the bottom of the tree is 6 foot 4 inches tall.



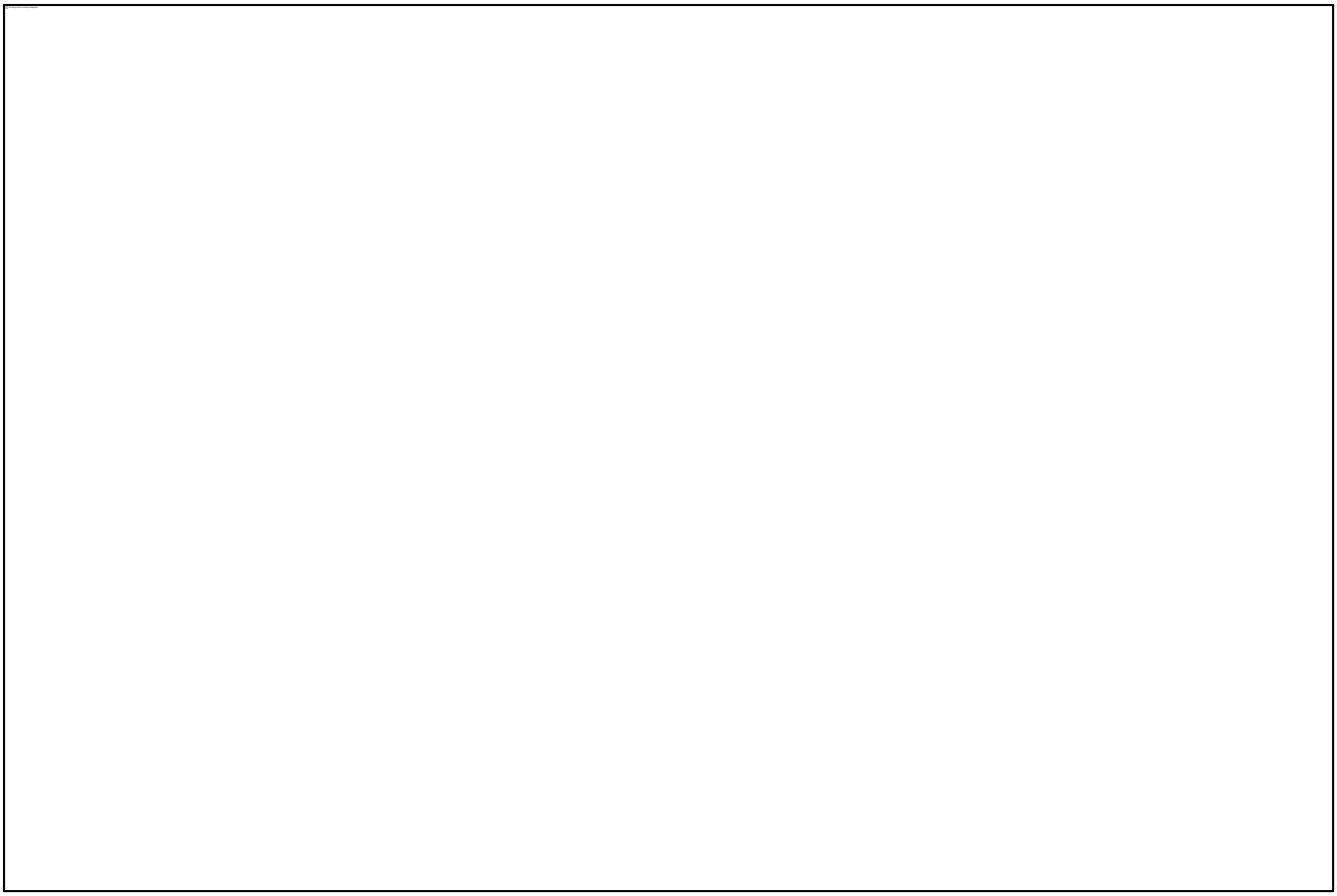
- Arizona bald eagles are one of the only bald eagle population that use cliffs as nesting substrate.
- Accessing these nest can be risky, as some have extreme consequences.



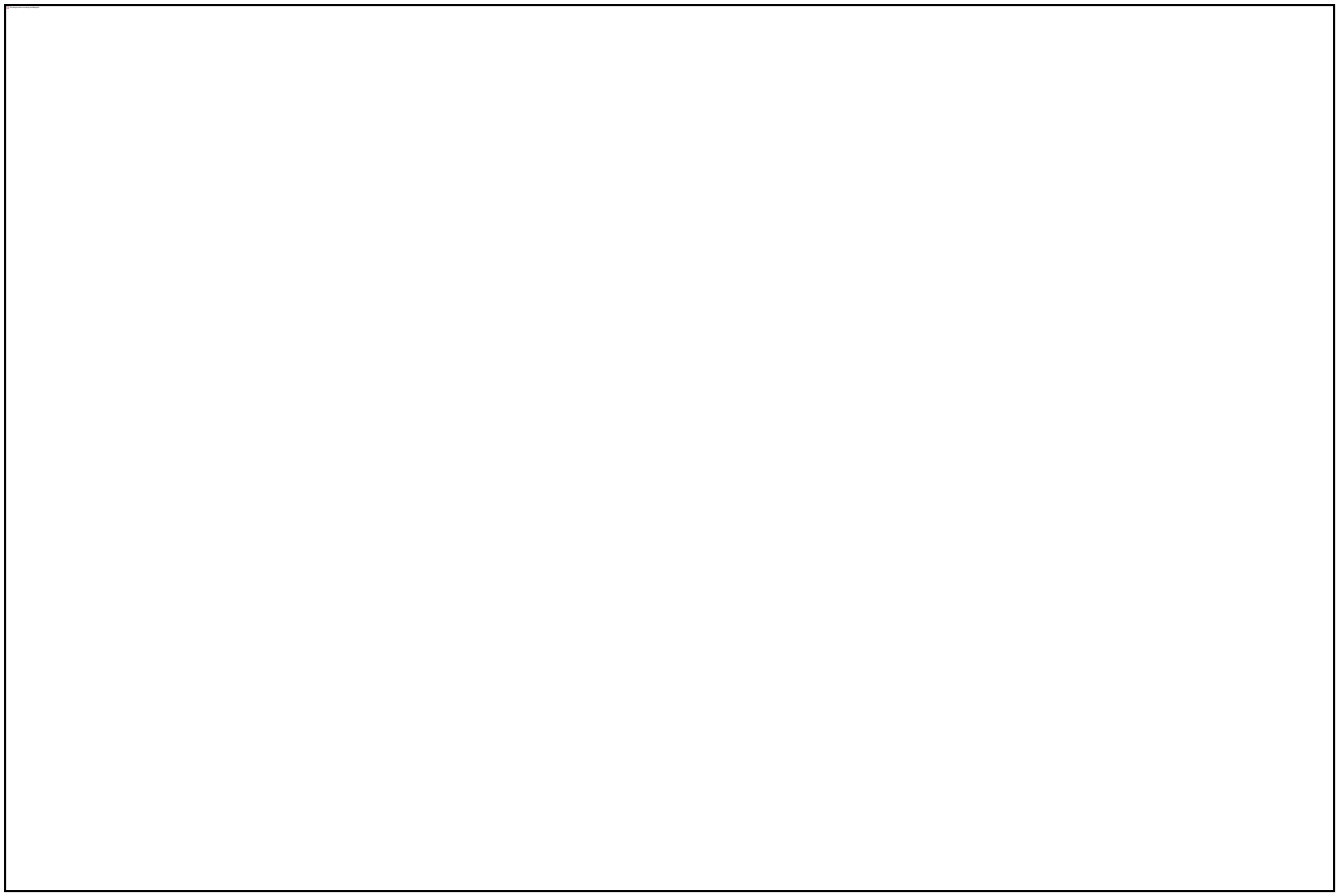
- But normally the risk is minimal, with a small amount of training.
- Most of the cliff nests are accessed by anchoring to the top of the cliff, and lowering one person on a rope.



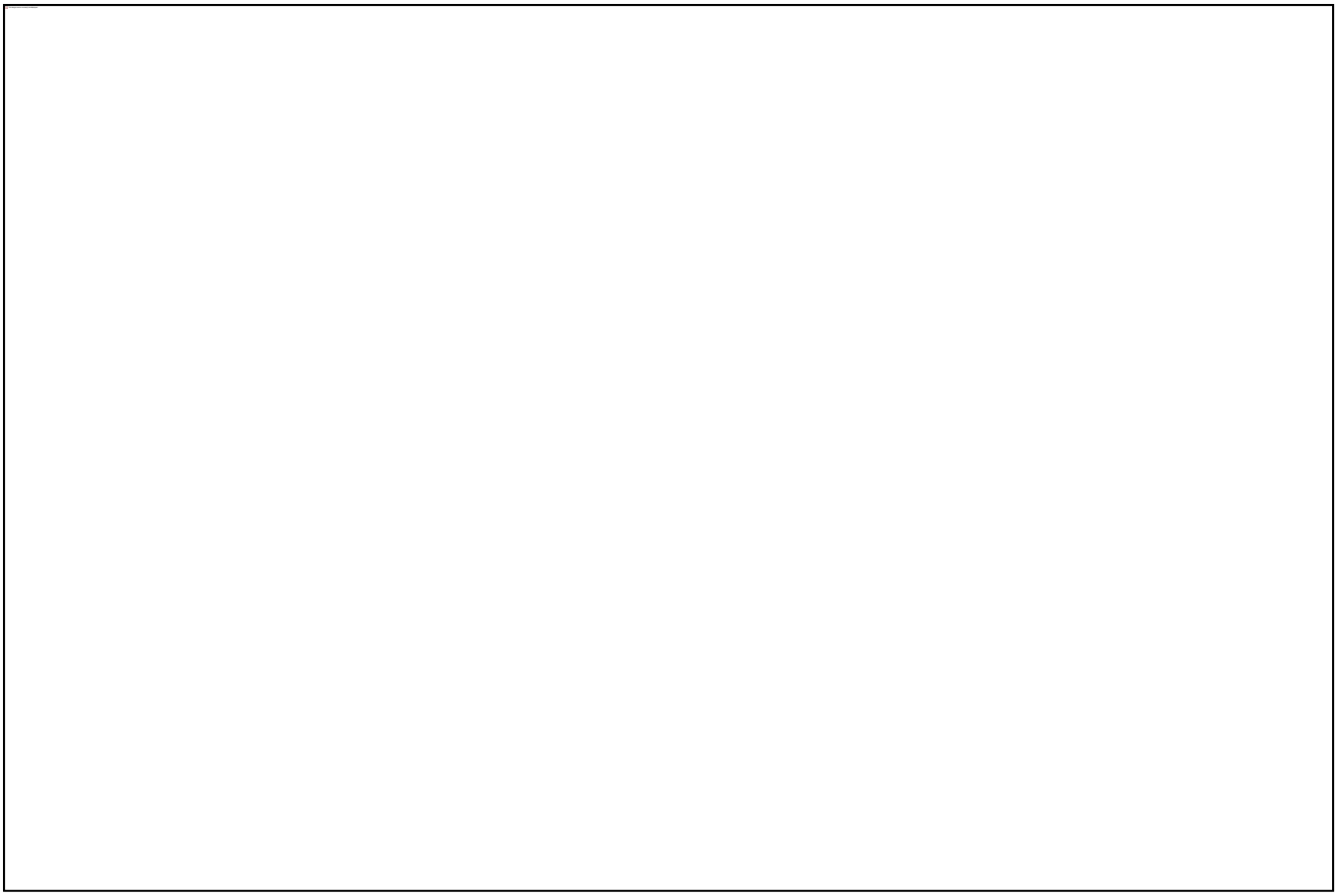
- If everything goes well, we can enter the nest and secure the nestlings.



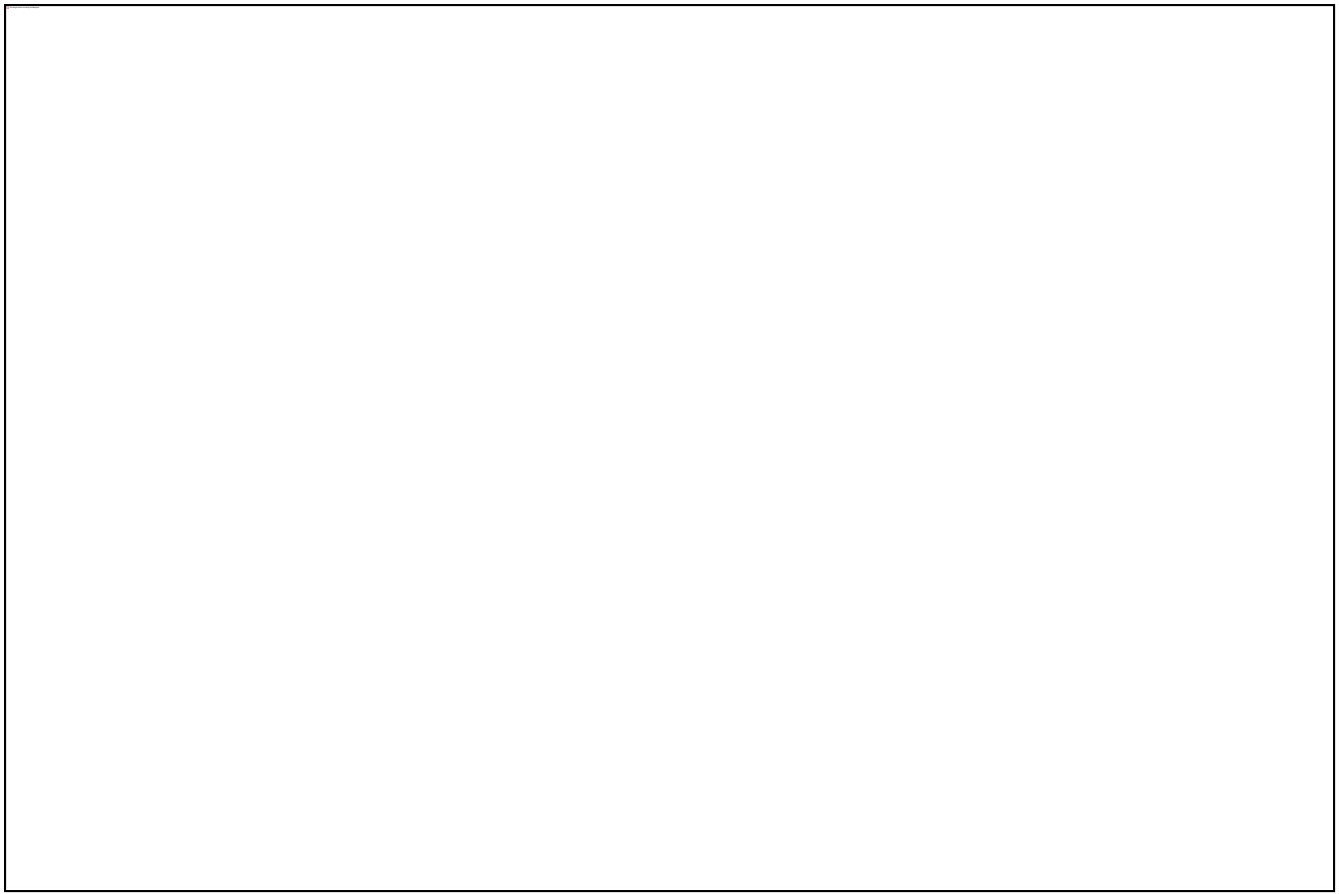
- The nestlings are then placed in a modified duffle bag, equipped with air vents and reinforced seams.
- The bag is then raised, or lowered, to the banding crew for measurements and processing.



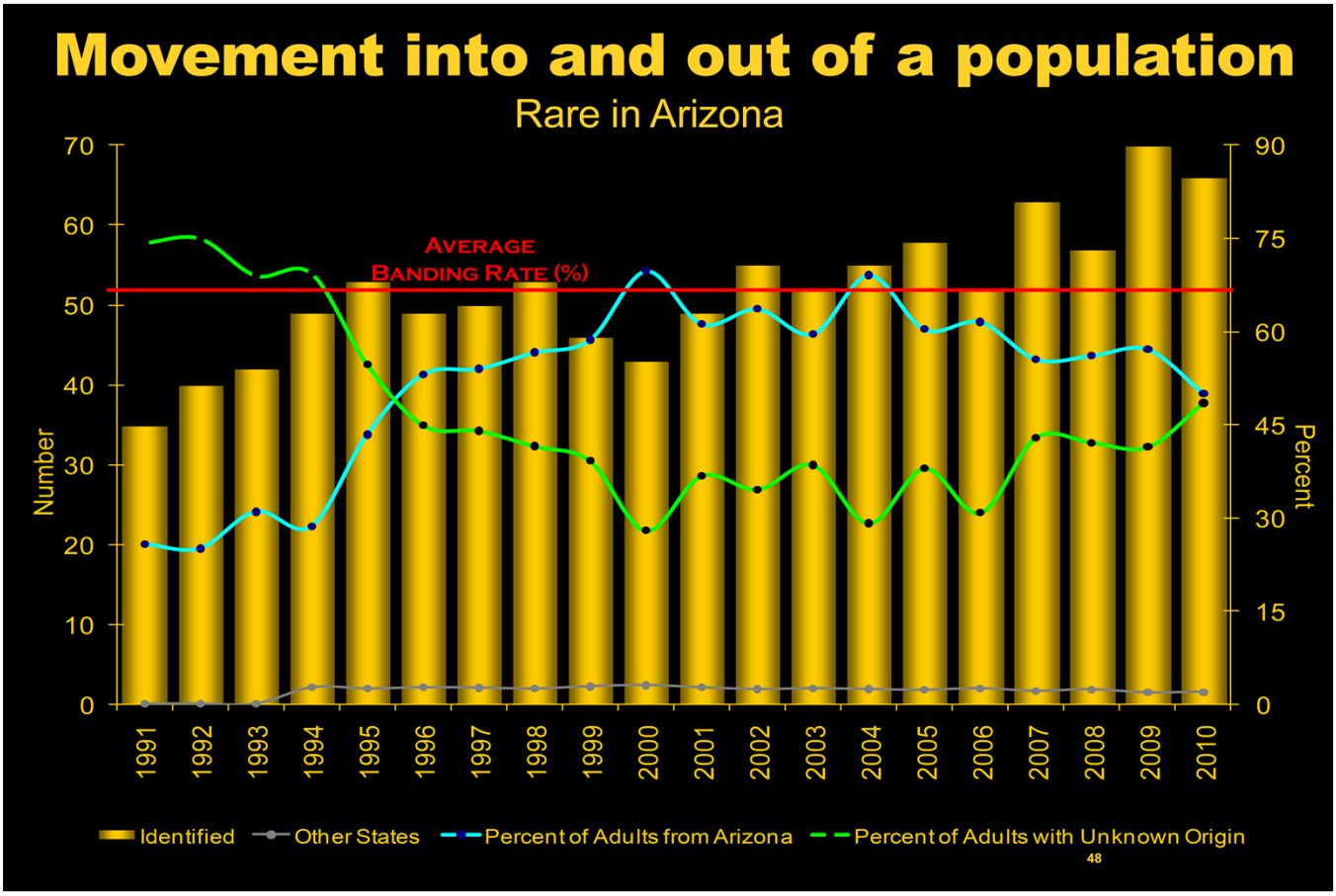
- Comical in appearance, these protective devices help calm the nestlings (the hoods), and keep the nestlings from grabbing us or their siblings during the banding process (the booties).



- If all goes well, the nestlings are returned to the nest unharmed, with their first drink of water, and some new leg jewelry.
- Our banding efforts have always taken into consideration the best interest of the birds and the climbers. In over 20 years of banding, not one nestling, nor one climber has been injured during the process.
- The information we gather during this two hours will supply us with years of valuable data on how to manage the population.

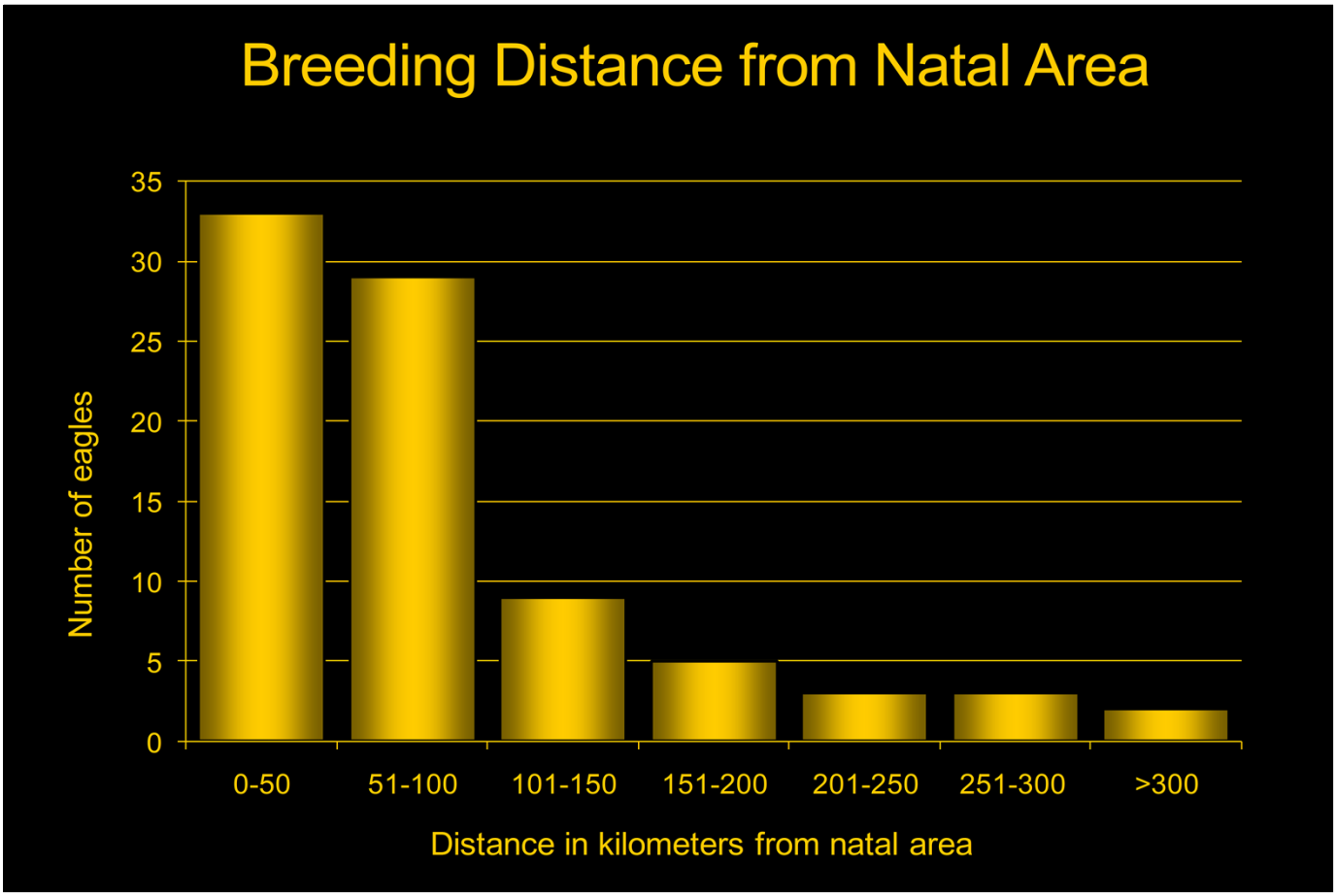


- The second stage of the Banding and Visual Identification project involves reading the identification band on the breeding adults.
- We have banded over 300 nestlings. After five years, some of those nestlings return to our population to breed. By reading the unique symbol engraved on each band, we are able to determine the age of the bird, the sex, where it came from, and how long it stays in the breeding area.
- This part of the project is the most time intensive. Attempting to read the band, which is only one inch tall, without becoming a disturbance to the breeding adults can take days or weeks.

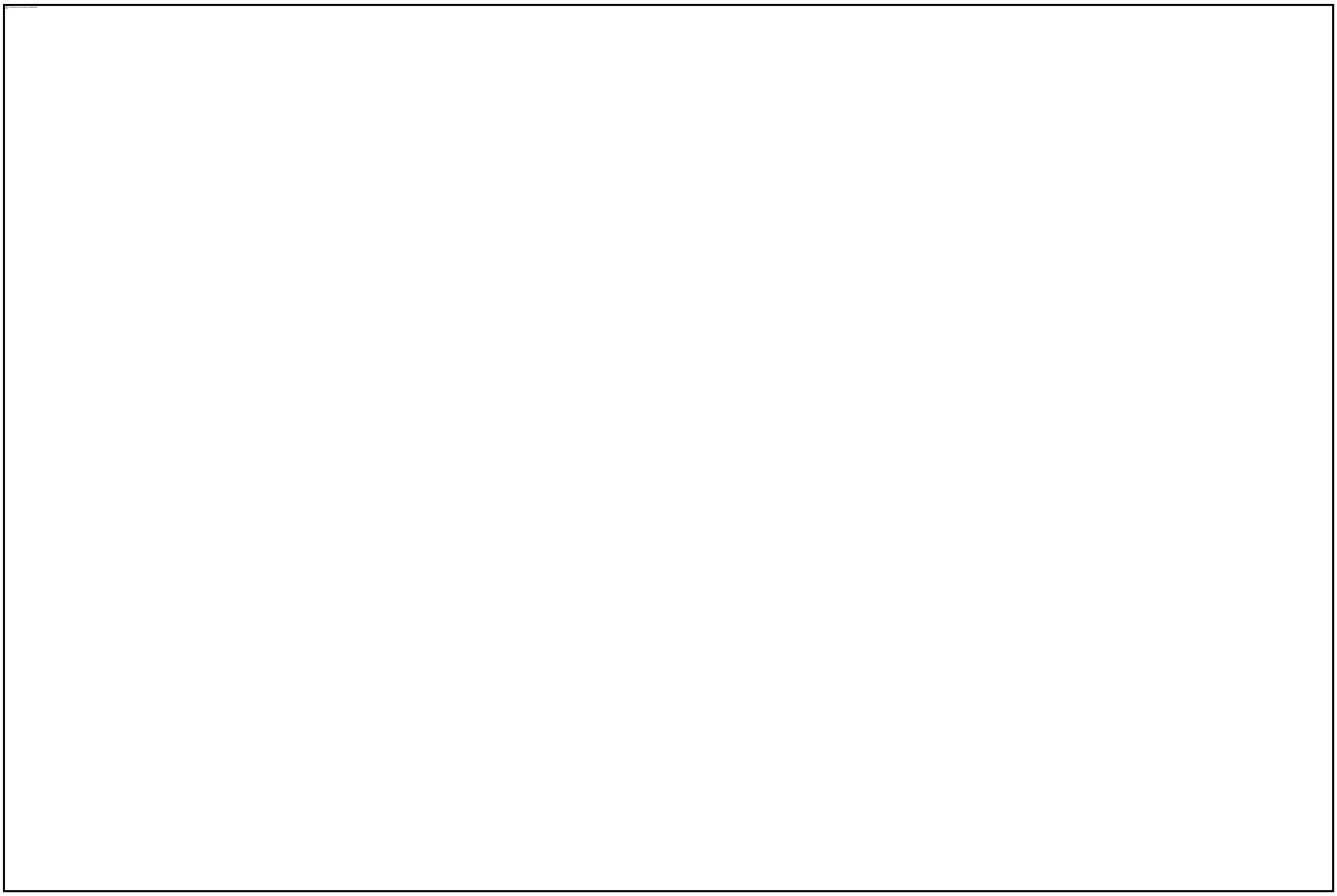


- In the 1970s and early 1980s, bald eagles were scarcely banded with a single band on one leg. In 1987, we began placing a unique identification band on the nestlings.

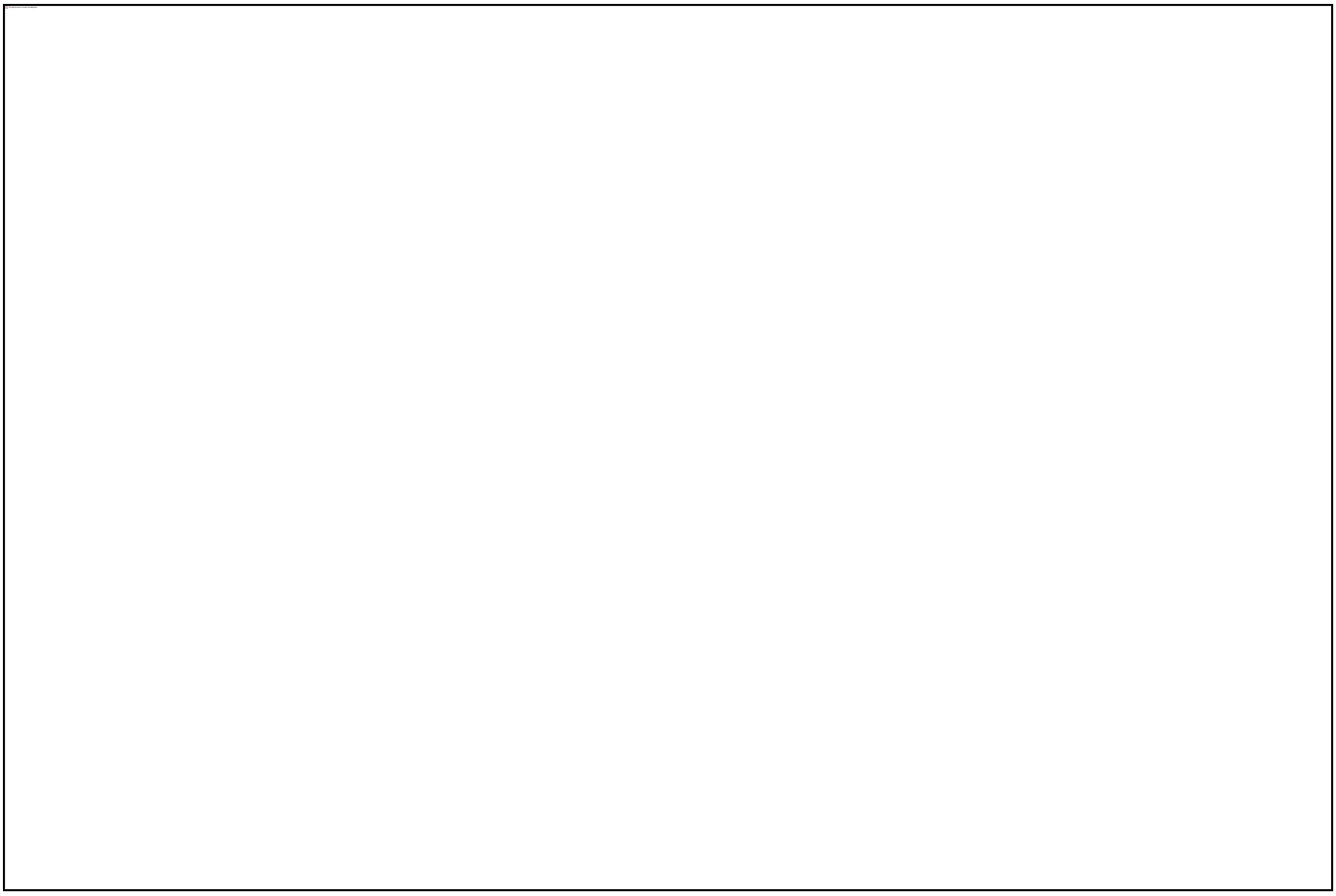
- Just recently, we have been able to show that most of the bald eagles breeding in our population were born in Arizona.



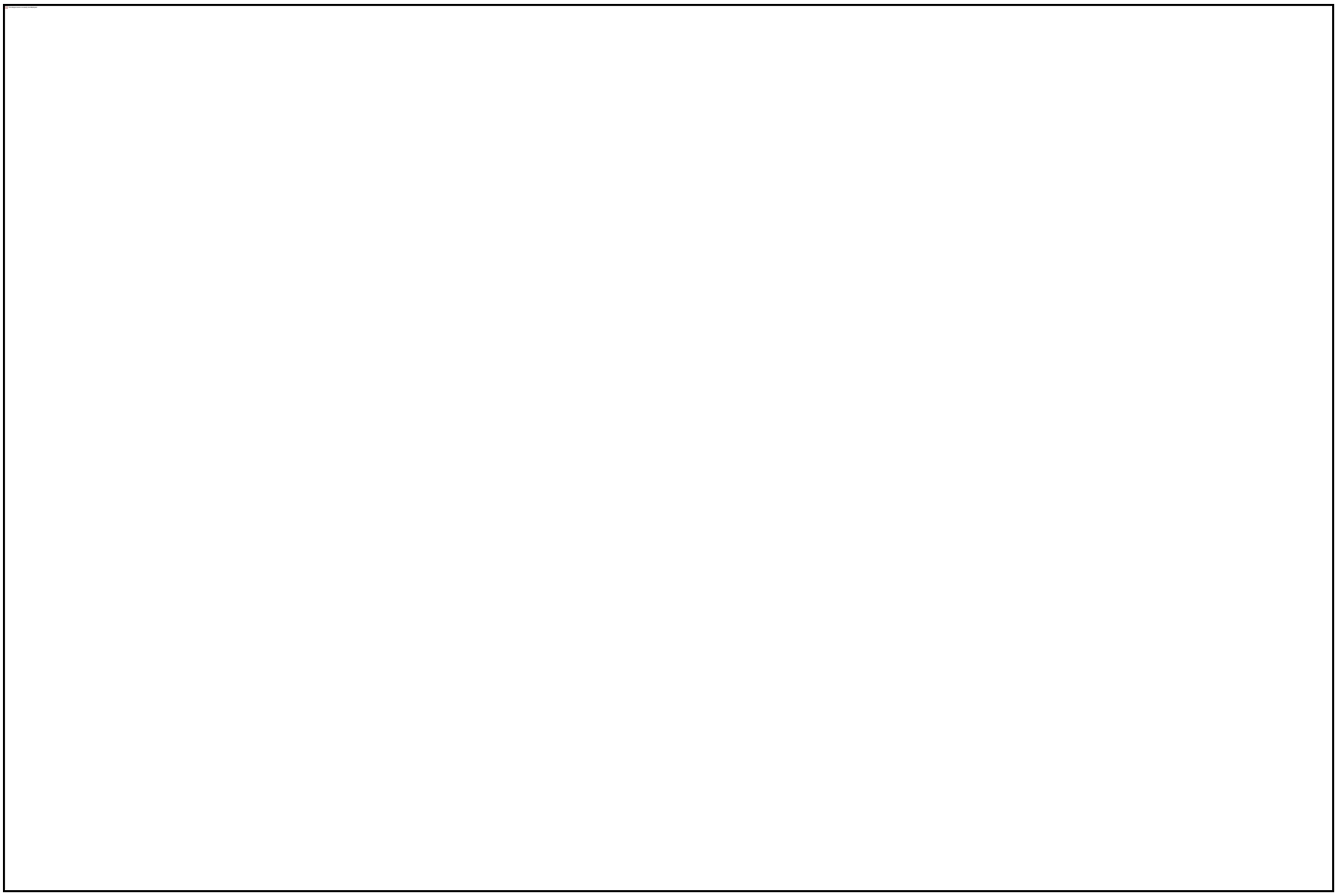
- Through band reading we know most of the nestlings will breed within 150 kilometers of where they were born.
- This heightens the importance of ensuring that Arizona produces as many nestlings as possible for population expansion.



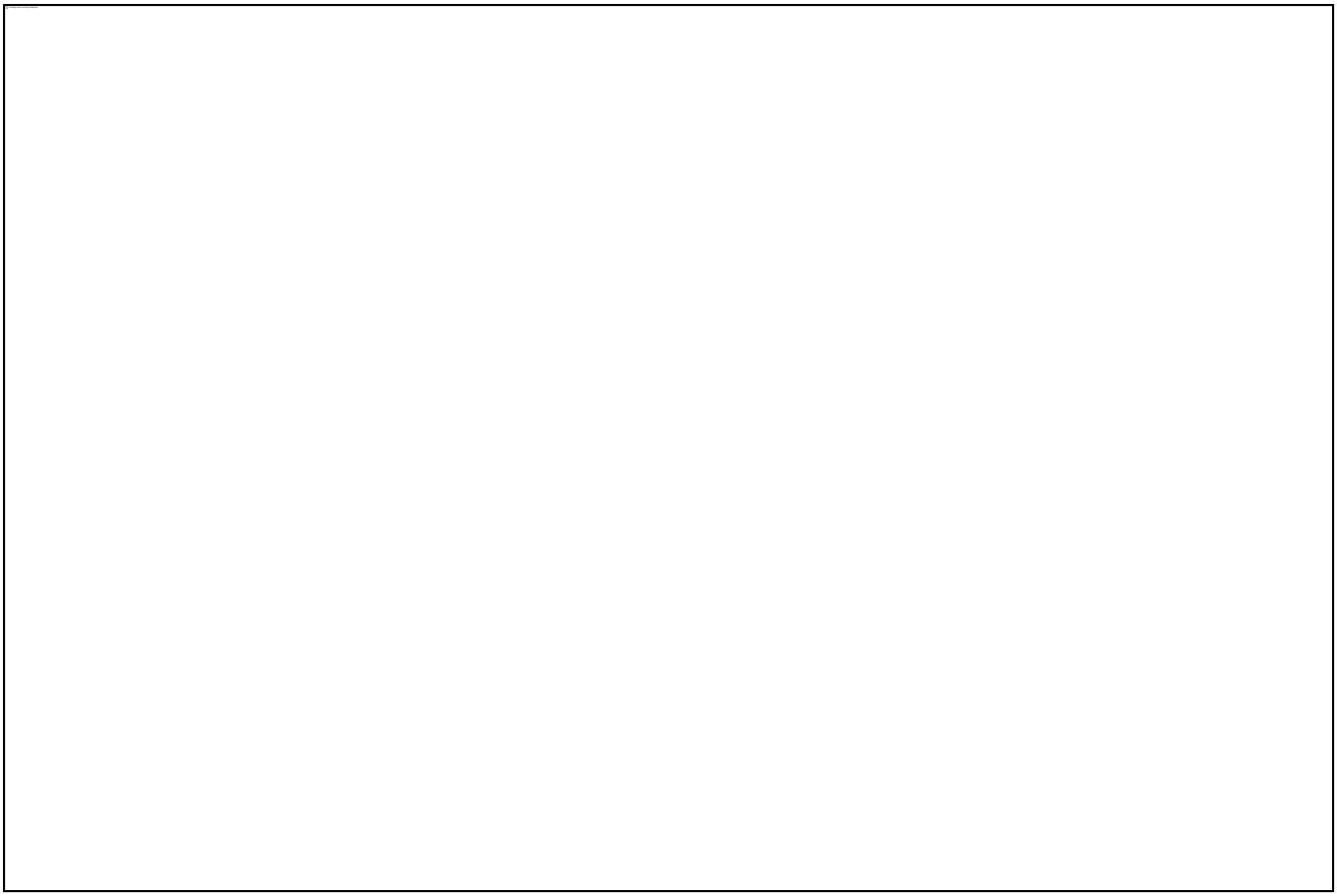
- And some age specific data that tells us how healthy our adult population is.



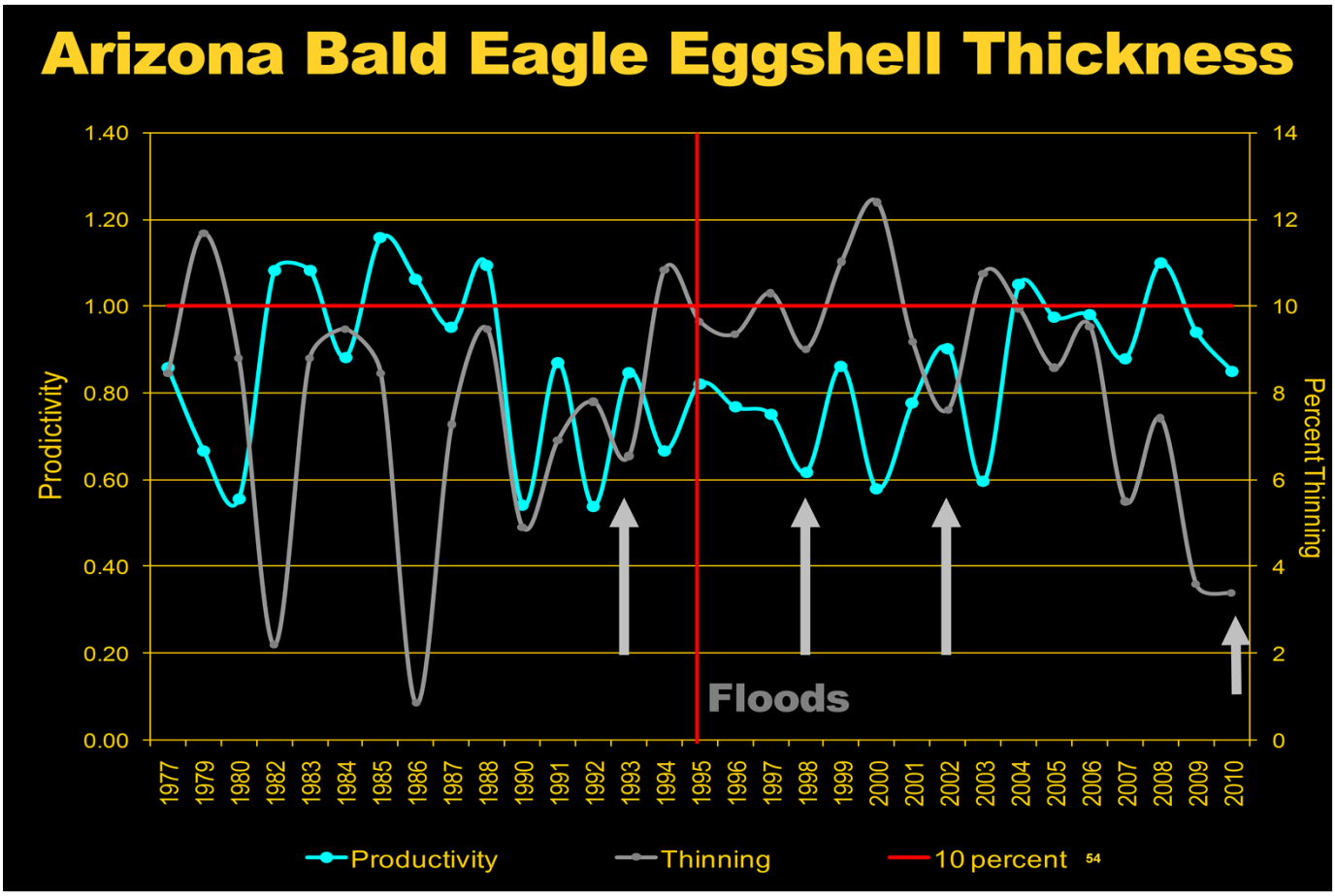
- We have also defined the average tenure of an adult and the average pair bond duration for our population.



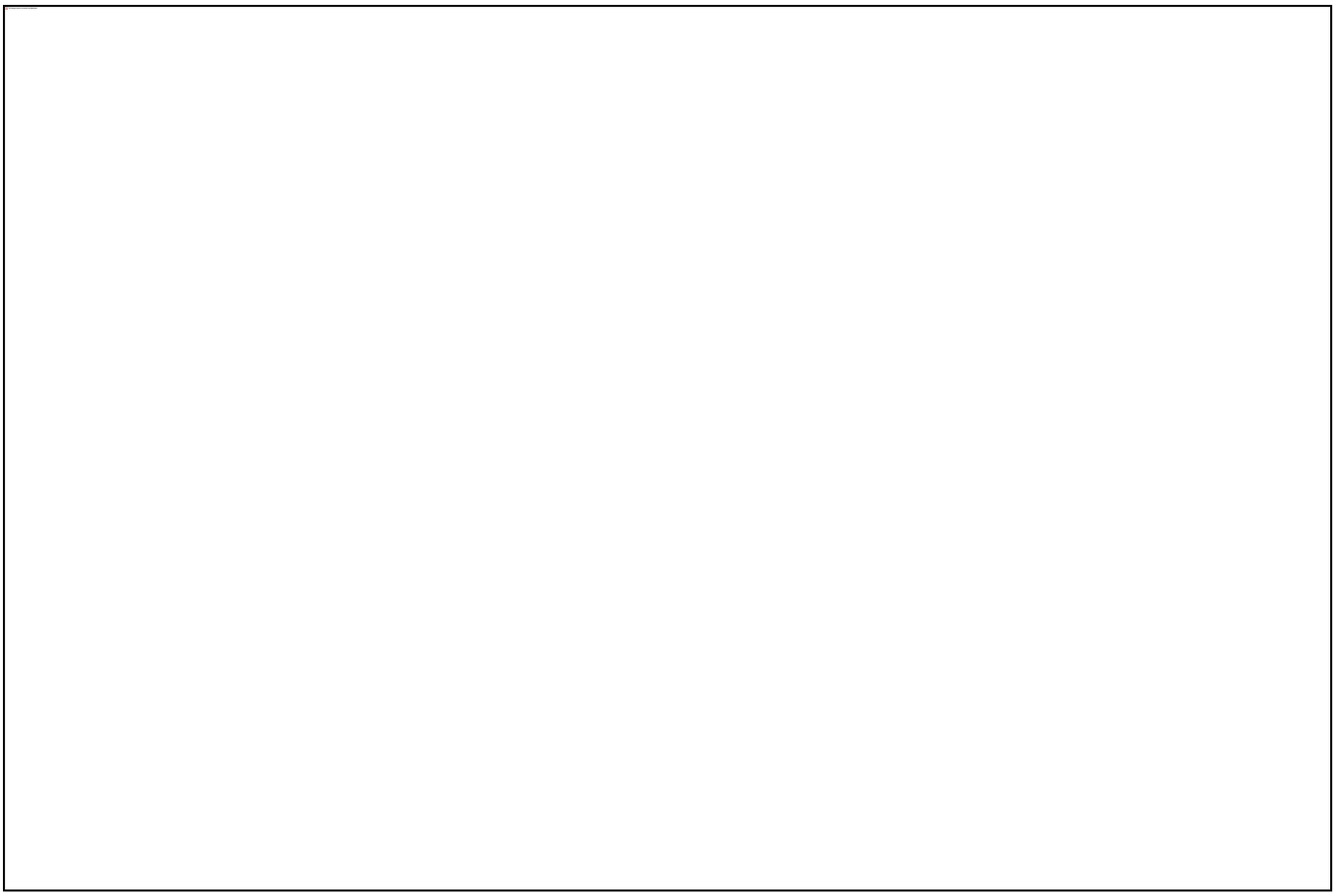
- The most significant decline in bald eagle populations came from the widespread use of DDT in the 1940s. Even though DDT was banned in 1973, its is still found in the environment, and in some areas, at toxic levels to bald eagles.
- Each year we collect addle (dead) eggs and eggshell fragment to monitor for the occurrence of this, and other contaminants that may affect bald eagle productivity.
- With assistance from the U.S. Fish and Wildlife Service, we also sample fish within bald eagle breeding areas to test for contaminants.
- Finally, we monitor for the occurrence of Mexican Chicken Bugs. These are a cliff dwelling, blood sucking parasite that can cause dehydration of the nestlings through blood loss.



- DDT, through its metabolite DDE, causes the calcium eggshell to become thin, and easily broken. We have discovered that Arizona bald eagle eggs are at threshold levels of being affected by this contaminant.



- We suspect that DDT, still present in the environment, is in locally restricted concentrations. During major flood events, the toxin may be leached throughout the watersheds, and absorbed in the bald eagles major prey item, fish.
- Over time, the contaminant settles once again, the levels of contaminants is the fish decreases. Thus the fluctuations we have observed in the thickness of eggshells.



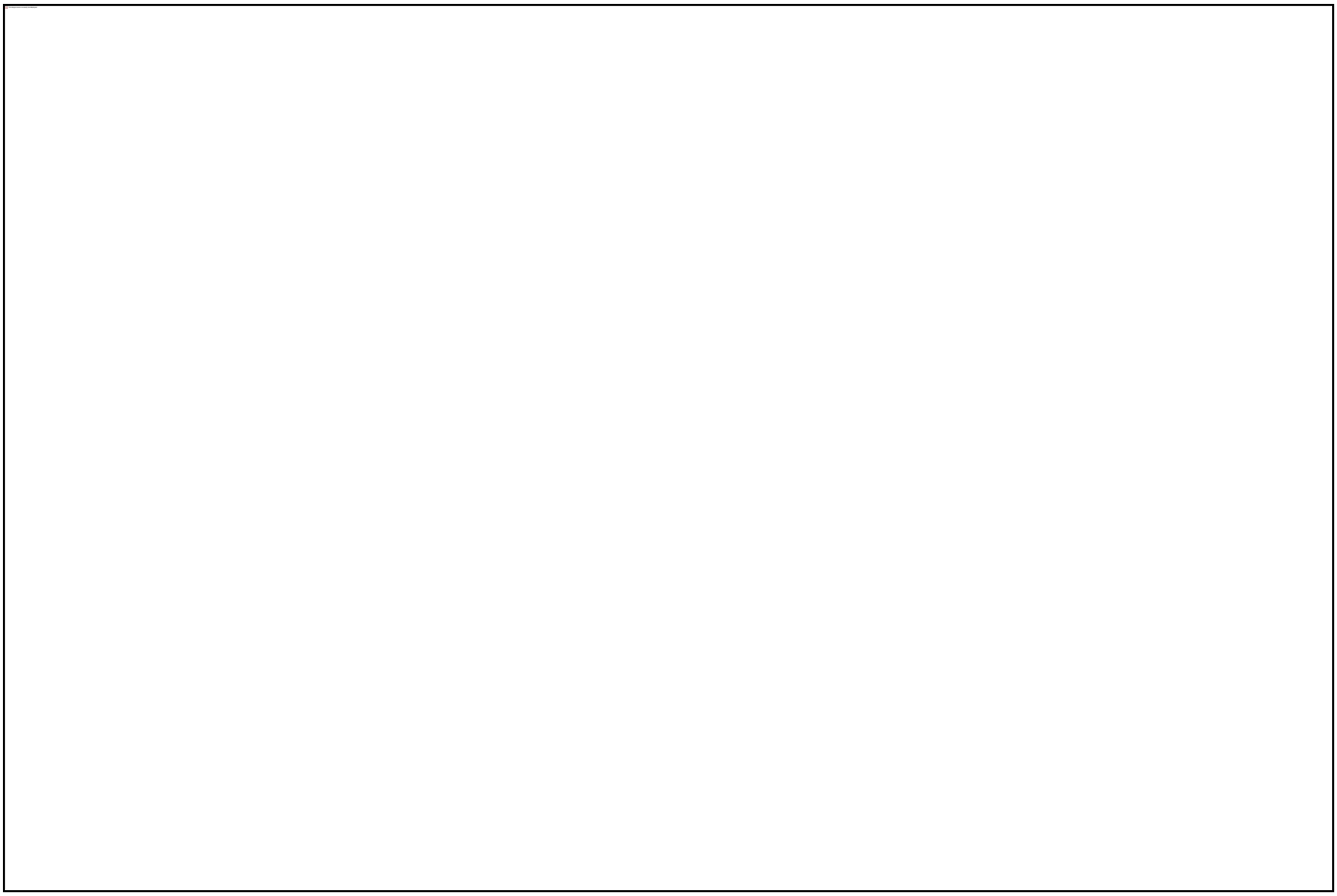
- In addition, methyl-mercury, a by-product of the mining and lumber industries, has been found in bald eagle eggs statewide, and in one case, at levels three times the toxic threshold.

Arizona Bald Eagle Winter Count

Project Goals and Responsibilities

- Conduct annual surveys along 102 standardized routes.
- Identify important wintering areas statewide.
- Identify management needs to protect wintering areas.
- Coordinate count information with National Coordinators for estimates of population sizes.

- A part of a nationwide effort, the Arizona Bald Eagle Winter Count helps national coordinators assess population numbers.
- Conducted largely by volunteers and agency workers, Arizona completes over 90 percent of the 102 routes, and documents an average 300 bald eagles visiting our state during the winter.



- In an effort to increase the state's winter count coverage, Salt River Project and the U.S. Bureau of Reclamation donate helicopter time to survey Arizona's steep canyons and remote lakes.
- Through this process, approximately four days are used to survey the entire Verde, Salt, White, Black, Gila. San Francisco, Blue, San Carlos, and Bill Williams rivers.

Laws Protecting Bald Eagles

Federal

1900 - Lacey Act

1918 - Migratory Bird Treaty Act

1940 - The Bald and Golden Eagle Protection Act.

1971 - Airborne Hunting Act

1975 - Convention on International Trade of Endangered Species

State

Arizona Revised Statutes, Title 17

- 1900 Lacey Act - Prohibits the importation wild mammals, or wild birds, which may be injurious to wildlife or the wildlife resources.
- 1918 Migratory Bird Treaty Act - Prohibits the take, possession or sale of any migratory bird, their eggs, parts, and nests. U.S.'s commitment with Canada, Japan, Mexico and Russia for the protection of shared migratory bird resources.
- 1940 The Bald and Golden Eagle Protection Act - Prohibited take, possession, or sale of any bald eagle, alive or dead, including any part, nest, or egg.
- 1967 Endangered Species Preservation Act - Listed as endangered south of the 40th parallel.
- 1971 Airborne Hunting Act - Prohibits shooting or harassing any bird from aircraft.
- 1975 Convention on International Trade of Endangered Species - Focuses on the protection of plant and animal species from unregulated international trade.
- ARS Title 17 – Protects a native wildlife in Arizona.