

# MANAGING EASTERN RED CEDAR IN NEBRASKA

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IF IT WERE EASY – EVERYONE WOULD BE DOING IT...



# WAS THERE ANY BACON ON THE BREAKFAST TABLE?

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LOOKS LIKE BACON...

BUT – DOESN'T SMELL OR TASTE  
LIKE BACON

If this cut wood makes you think of  
bacon we can be friends.



IF YOU HAVEN'T TASTED EASTERN RED CEDAR WOOD  
– JUST ASK A BEAVER... THEY DON'T LIKE IT EITHER

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## EASTERN RED CEDAR 101

It is a Juniper – not a true cedar...

It is dioecious – meaning there are MALE trees and FEMALE trees.

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It does not sprout from the stump or regenerate other than by seed.

It is highly susceptible to fire.

Therefore, it SHOULD be easier to manage than other invasive species.



2015 © Peter M. Dziuk

# OKAY – LET’S TALK ABOUT INVASIVE...

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- **Invasive** adjective \ in- 'vā-siv, -ziv\
  - of a nonnative organism :growing and dispersing easily usually to the detriment of native species and ecosystems
- As per Executive Order 13112 (Section I. Definitions) an "invasive species" is defined as a species that is:
  - 1) non-native (or alien) to the ecosystem under consideration and;
  - 2) whose introduction causes or is likely to cause economic or environmental harm or harm to human health.
- The key term is “ECOSYSTEM” and how those boundaries are defined...



# NEBRASKA INVASIVE SPECIES COUNCIL ACTION

- The Nebraska Invasive Species Council – an advisory committee appointed by the Governor
  - Listed Eastern Red Cedar as a “Problematic” species
- Similar issues arise with other “native” species such as reed canarygrass, phragmites, or even animals such as coyotes as they expand range

NEBRASKA INVASIVE SPECIES PROGRAM

Home About Species Events Resources Report a Sighting

Nebraska | IANS | Nebraska Cooperative Fish & Wildlife Research Unit | Invasive Species Program | Species | Facts | Eastern Redcedar

## EASTERN REDCEDAR

*Juniperus virginiana*

Eastern redcedar were once rare and have now become abundant, and poses massive threats to Nebraska’s rangelands and the people, wildlife, plants and insects that depend on them. Grass fires historically prevented Eastern redcedar from becoming abundant in rangelands. People have not only removed fire from rangelands, but millions of Eastern redcedars have been planted in Nebraska, resulting in the rapid expansion of redcedar populations. Learn more about Eastern redcedar on the [ERC Science Literacy Page](#).

### IMPACTS OF ERC ENCROACHMENT

Eastern redcedar encroachment is often ignored because of the initially slow process of the encroachment. However, once redcedar is established it expands quickly, converting rangelands into redcedar woodlands and has major impacts on society and the environment including:




Image of cedar-apple rust on a redcedar tree in Lincoln, NE

# CONSERVATION ROUNDTABLE ACTION – AANND... EASTERN RED CEDAR SUMMIT ACTIVITIES

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- A “Conservation Roundtable” group was formed several (5?) years ago and identified resources issues universal to all conservation agencies/organizations
- A “White Paper” was developed that outlined the issue and recommended actions that needed taken
- A “Red Cedar Summit” sub-committee was formed and met several times from late 2015 through 2017



**Private Lands and Eastern Red Cedar Summit**

It is a defining time in Nebraska for ERC management.  
We must do more, we must work together, we must act.

**Agenda and Invitees :  
[Click Here](#)**

Join us to begin this process.  
**Tuesday, November 10th**  
9:00 am  
Staybridge Suites (I-80)  
2701 Fletcher Ave  
Lincoln, NE 68504

Please RSVP  
Kristen Hassebrook  
402-475-2333  
khassebrook@necattlemen.org

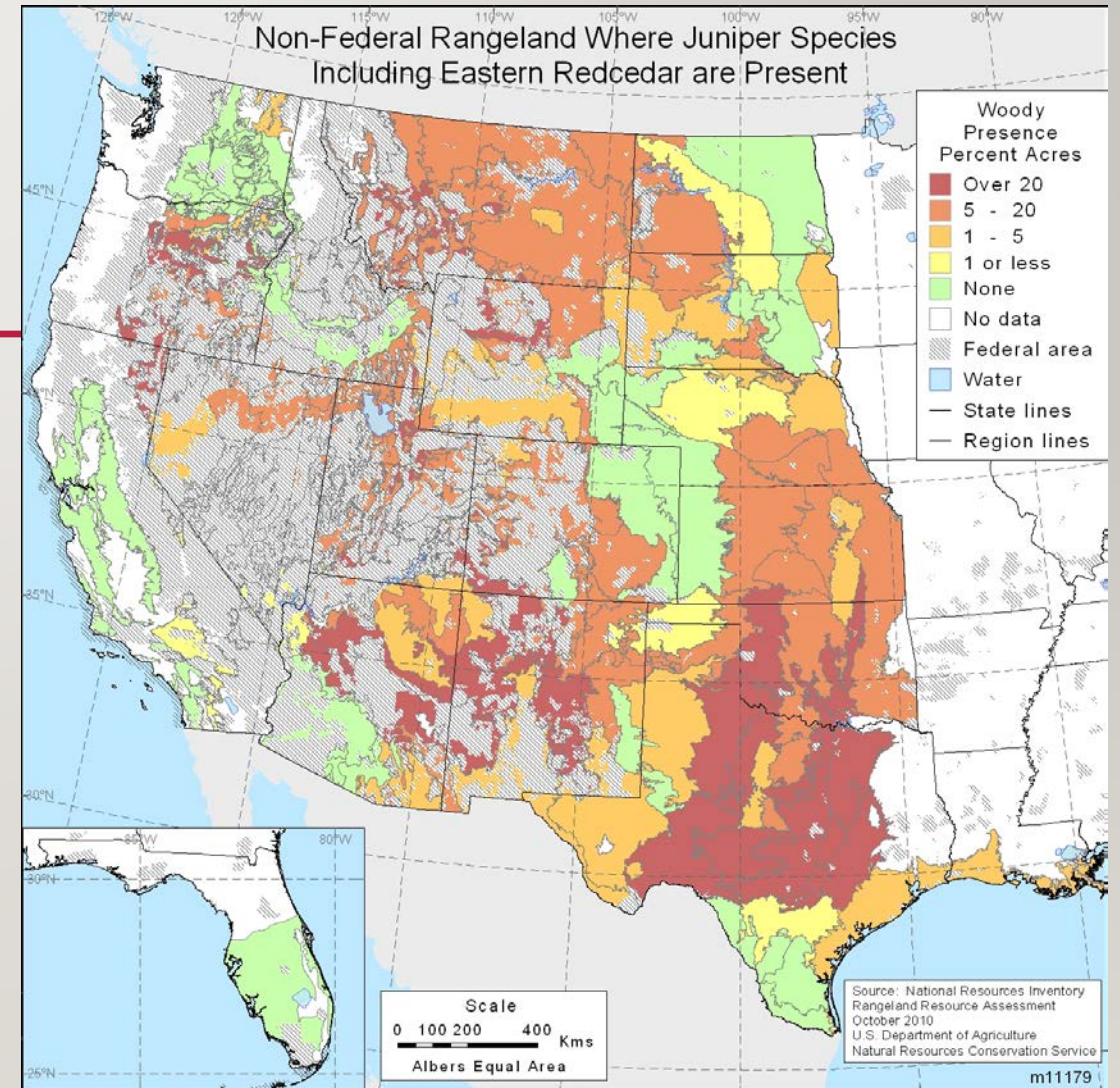
  

Protecting Lives • Protecting Property • Protecting the Future.

# JUNIPER INVASION ACROSS NORTH AMERICA

- Juniper invasion is slowly transforming the remaining perennial systems of the Great Plains
- Twidwell et al. 2013 *Frontiers in Ecology and the Environ.*; Garmestani et al. 2013
- Multiple species of juniper across various ecotones occurring in past century – i.e.
  - *J. occidentalis* – Eastern Oregon
  - *J. osteosperma* – Great Basin
  - *J. monosperma* – NM and AZ





# NEBRASKA HAS TWO JUNIPER SPECIES

EASTERN RED CEDAR – J. VIRGINIANA

ROCKY MOUNTAIN JUNIPER – J. SCOPULORUM

- Eastern red cedar grows primarily in the eastern  $\frac{3}{4}$  of Nebraska
  - One year seed cycle to maturity
- Rocky Mountain juniper grows primarily in the Panhandle (western  $\frac{1}{4}$  of Nebraska)
  - Two year seed cycle to maturity
  - Susceptible to disease in Eastern  $\frac{1}{2}$  of Nebraska (fungus)
- Hybrids near Lewellen?

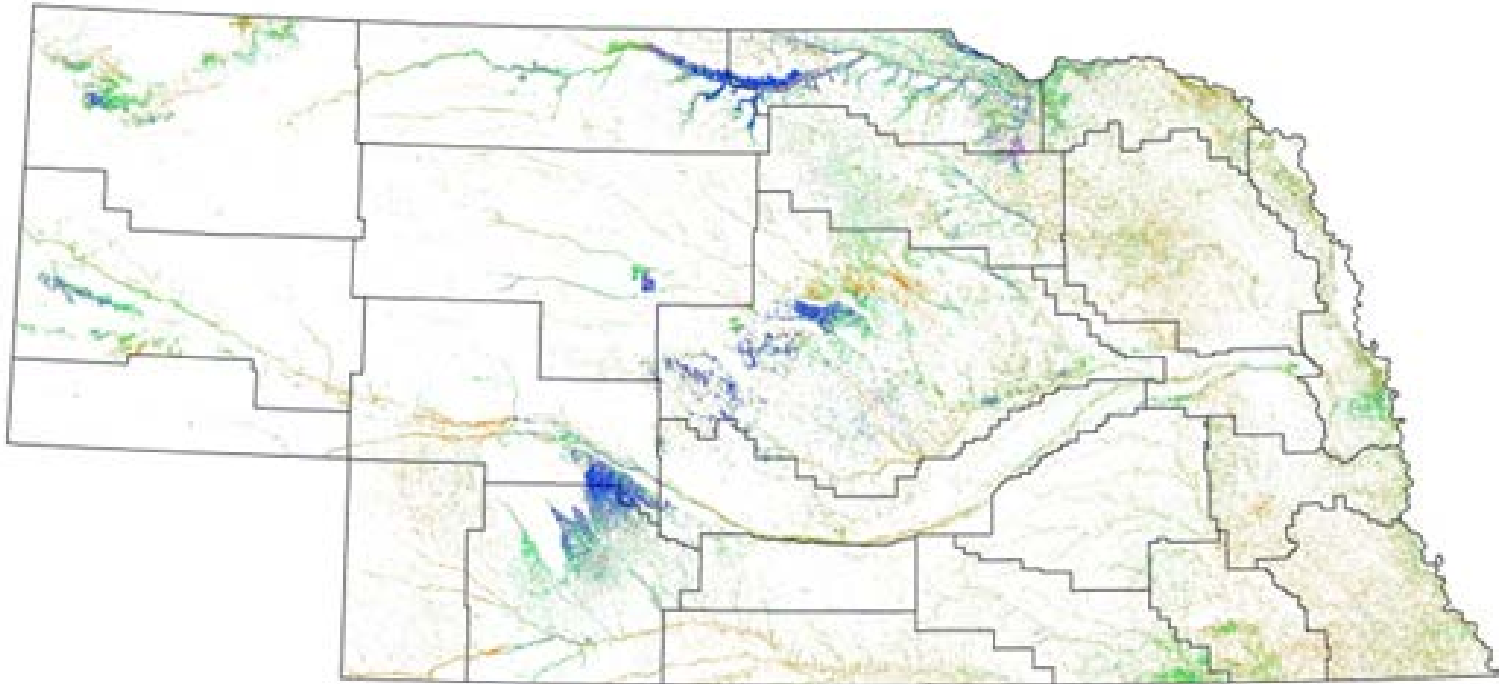


# FACTS FROM ERC WHITE PAPER

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- ERC now constitutes 25% of Nebraska's Forest
- Encroachment into grasslands has averaged 25,000 acres and into forests/woodlands has averaged 13,000 acres per year in recent years
- Between 2005 and 2012 the number of seedlings in Nebraska doubled to an estimated 300 million





### Live Density of Eastern Redcedar and Rocky Mountain Juniper

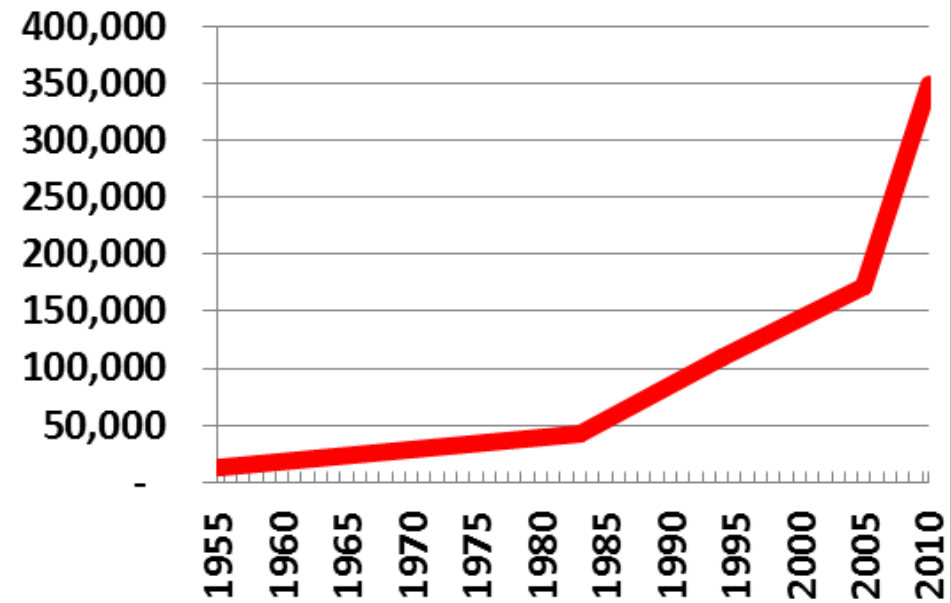
trees per acre (1.0-inch DBH or larger)

- more than 100
- 51 - 100
- 10 - 50
- less than 10



Processing note: this map was produced using a variation of the k-nearest-neighbor technique to apply information from forest inventory plots to remotely sensed MODIS imagery (250-meter pixel size) based on the spectral characterization of pixels and other geospatial information. Sources: U.S. Forest Service, Forest Inventory & Analysis Program, 2009 data. NRD boundary data are provided by the Nebraska Natural Resources Commission and the U.S. Bureau of Census.

### Estimated Acres of Eastern Redcedar Forest



# IMPACTS OF ERC IN NEBRASKA

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- Loss of native grassland habitat for grassland nesting birds and other wildlife species associated with grasslands
- Reduced grazing land productivity due to reduced grass health, availability, vigor and species diversity
- Increased risk to life and property from catastrophic wildfire (e.g., suppression costs, loss of physical infrastructure, human health risks (fire, smoke), damage to soils, flooding, reduced air quality)
- Altered forest structure and function of existing hardwood and pine forest communities
- Reduced biological diversity in both grasslands and forests, with potentially negative impacts to sensitive species and/or T&E species
- Reduced water availability due to increased water use and interception by ERC as compared to upland grasses and forbs.
- Changes in stream channel morphology and altered natural hydrology
- High costs to landowners for removal and disposal using both mechanical methods followed by prescribed fire.
- Loss or degradation of native riparian forest communities (e.g. cottonwood gallery forests) important to many wildlife species, game and non-game, and sensitive species such as bald eagles

# VISION FOR ERC IN NEBRASKA

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- grasslands and pastures are managed in ways that reduce ERC populations; improving grass health and vigor, enhance and conserve native wildlife habitat in grasslands, and protect species diversity at the landscape scale;
- forests containing ERC are managed to enhance timber quality and economic value of all species, , increase plant diversity within forests, enhance forest ecological resilience and function, and reduce the risk of catastrophic wildfire; and
- ERC is a valuable tree species on the Nebraska landscape, with multiple and profitable markets, contributing to landowner income, job creation and economic development.

# INNOVATIVE USES OF ERC

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- Create a local movement of saunas made of Eastern red cedar
- Introduce locally-made gin into micro-brew industry



# RESOURCE CONSIDERATIONS

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## Negative Impacts of ERC Invasion

- Habitat Degradation
- Undesirable Plant Productivity and Health
- Wildfire Hazard and Excessive Biomass Accumulation

## Positive Impacts for Use of ERC

- Wind Erosion (Are ERC needed to adequately address wind erosion?)
- Air Quality (How does ERC impact ability to address odor management?)
- Energy (Farmstead and Feedlot Windbreaks for energy conservation and snow management)

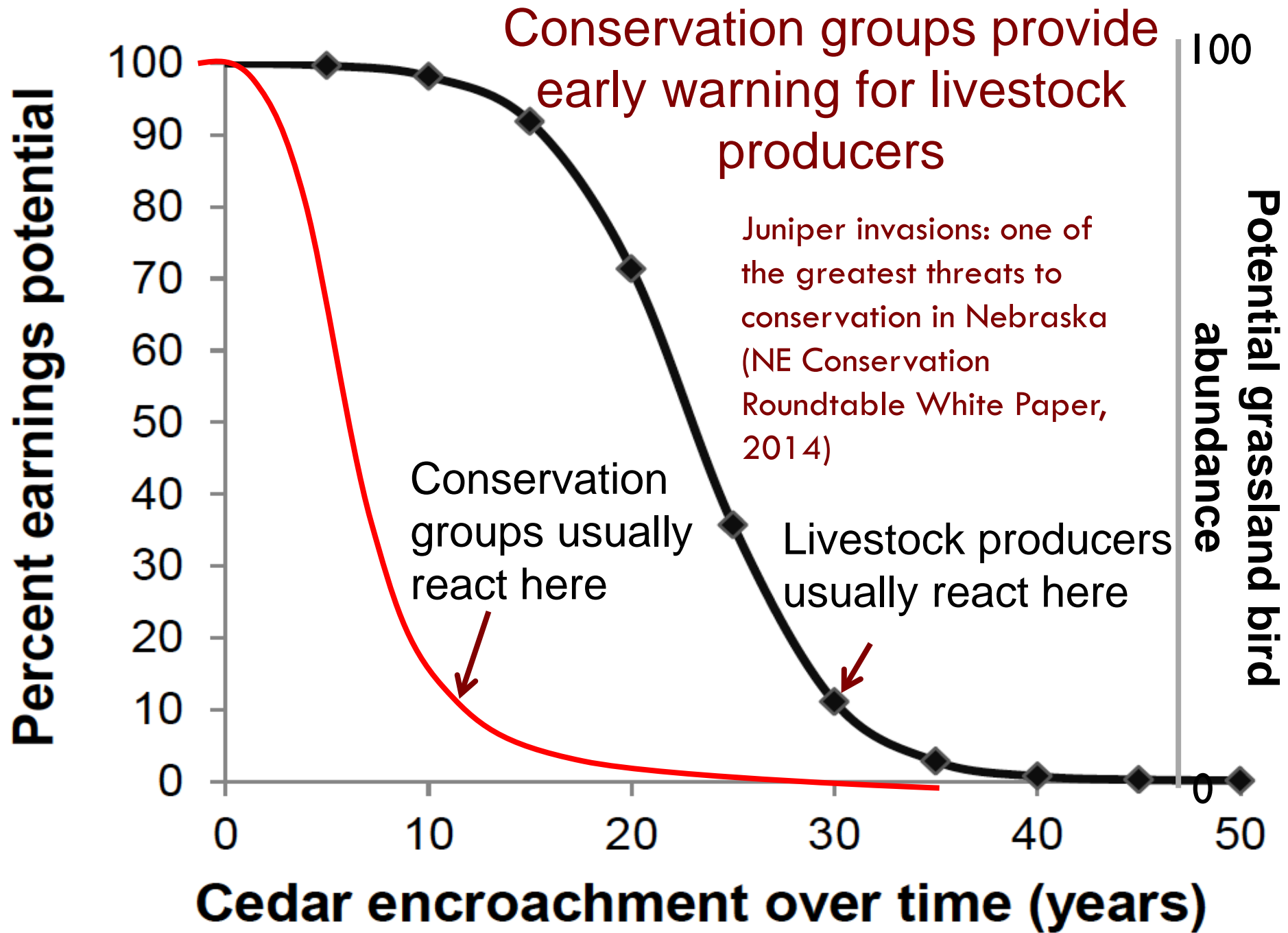
# USE OF EQIP FOR PLANTING AND REMOVING EASTERN RED CEDARS

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- Planting Eastern Red Cedars - \$2 million provided to 1900 producers to install 6 million feet of windbreaks
- Brush Management - \$15 million provided to 4000 producers to remove cedar trees from 225,000 acres
- Prescribed Burning - \$1.5 million provided to 600 producers to burn 170,000 acres

Nebraska NRCS data from 2007 through 2018



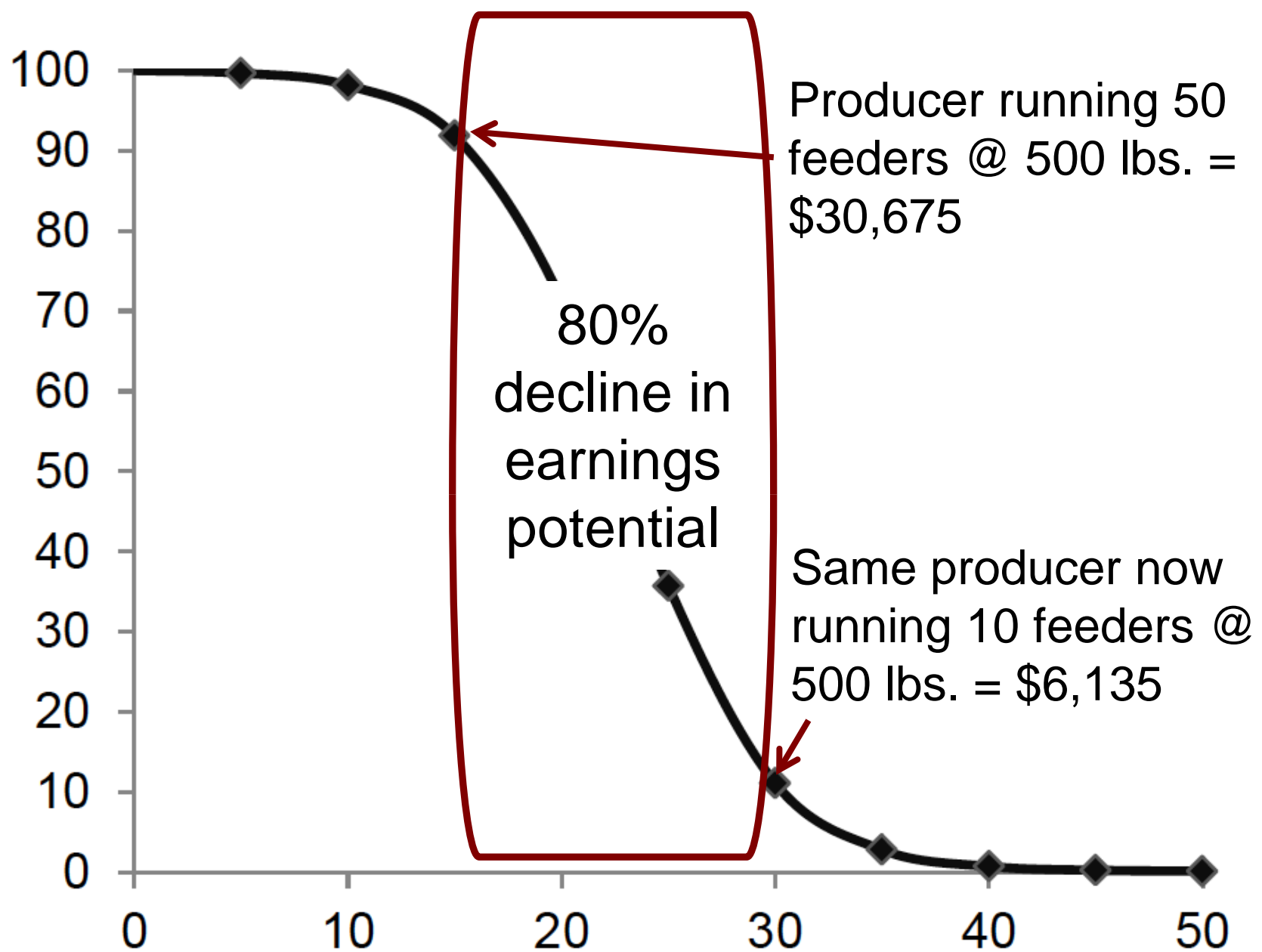


# GRASSLAND BIRDS MAY DECLINE WITH AS LITTLE AS 5% EASTERN RED CEDAR ENCROACHMENT

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**Percent earnings potential**



**Cedar encroachment over time (years)**

Simonsen *et al.* 2015 UNL Extension

# WHY PLANT RED CEDARS?

- Nebraska has a long history of planting many species of trees – especially Eastern red cedar.
- Bessey Nursery began producing ERC in 1902
- Peak production and sales occurred in 1979/1980
  - At one point, sales of ERC was 65% of Bessey sales
  - Currently, sales of ERC are approximately 15%
- Last year, sales of ERC from Bessey in Nebraska were 131,625 (those sales have been low for a few years)

Source: Gilbert, USFS - 2018

State	Mean annual distribution of Eastern redcedar seedlings	Year when distribution started	Justification	
			Wildlife habitat	Windbreak/crosion control
Nebraska	850,000	1926	X	X
South Dakota	500,000	1959	X	X
North Dakota	200,000	n.a.		X
Kansas	115,000	1958	X	X
Iowa	100,000	1982	X	X
Missouri	100,000	1949	X	X
Minnesota	98,000	1961	X	X
Oklahoma	85,000	1948		X
Texas	23,500	1982		X
<b>Total</b>	<b>2,071,500</b>			

Data from Ganguli et al. 2008



# USING TECHNOLOGY TO ADDRESS THE ISSUE

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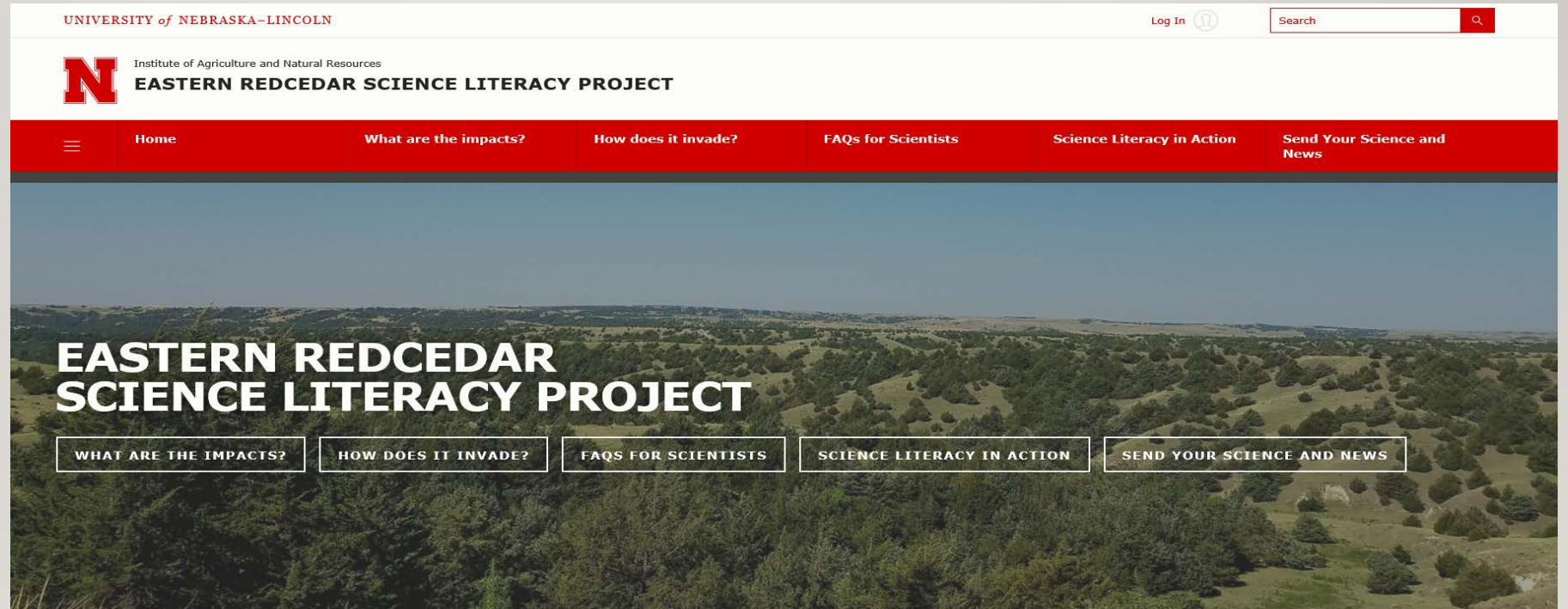
- Nursery in Georgia provided “Male Only” plants of the “Burkii” variety/selection
  - Over half had fruit and all died within two years
- Bessey Nursery attempted rooting cuttings from male trees – only 1% developed roots
- In 2014, Ryan Armbrust with Kansas Forest Service started trying to perfect the cutting/rooting process
- Grafting is an option – but time consuming and costly
- Plant Material Center at Manhattan planted “Modoc Cyprus” as a trial in Nebraska with no success
- Bessey Nursery started growing larger containerized stock of Ponderosa pine, limber pine and Southwestern white pine
  - Putting into test plots across Nebraska
- Historic Data from Sandhills shows 40% of windbreaks contained P. pine (>30 years old)

# GROUP 3 LOAMY SOILS

Soils Group	Tree/Shrub Type	Species	ZONE I		ZONE II		ZONE III		ZONE IV	
			20-YEAR	MATURE	20-YEAR	MATURE	20-YEAR	MATURE	20-YEAR	MATURE
			HEIGHT (ft)	HGT/SPREAD (ft)	HEIGHT (ft)	HGT/SPREAD (ft)	HEIGHT (ft)	HGT/SPREAD (ft)	HEIGHT (ft)	HGT/SPREAD (ft)
3	CONIFEROUS TREES	Arborvitae, American or Northern White Cedar <i>Thuja occidentalis</i>	Not Recommended	Not Recommended	Not Recommended	Not Recommended	15-20	25-30/20	15-20	25-30/20
3	CONIFEROUS TREES	Arborvitae, Oriental 1/ <i>Thuja orientalis</i>	Not Recommended	Not Recommended	Not Recommended	Not Recommended	Not Recommended	Not Recommended	15-20	15-20/15
3	CONIFEROUS TREES	Baldcypress <i>Taxodium distichum</i>	Not Recommended	Not Recommended	Not Recommended	Not Recommended	20-25	30-35/20	20-30	40-50/20
3	CONIFEROUS TREES	Fir, Douglas <i>Pseudotsuga mucronata</i>	Not Recommended	Not Recommended	Not Recommended	Not Recommended	20-25	30-35/20	20-30	40-50/20
3	CONIFEROUS TREES	Fir, White <i>Abies concolor</i>	Not Recommended	Not Recommended	20-25	30-45/30	20-25	30-45/25	20-30	40-50/25
3	CONIFEROUS TREES	Juniper, Rocky Mountain 1/ <i>Juniperus scopulorum</i>	10-20	15-25/15	10-20	15-25/15	Not Recommended	Not Recommended	Not Recommended	Not Recommended
3	CONIFEROUS TREES	Pine, Austrian <i>Pinus nigra</i>	5-20	30-50/20-30	15-30	30-50/20	20-30	35-50/20	20-35	40-60/20
3	CONIFEROUS TREES	Pine, Eastern White <i>Pinus strobus</i>	Not Recommended	Not Recommended	25-30	35-40/20	20-25	40-50/20	30-35	40-60/20
3	CONIFEROUS TREES	Pine, Jack <i>Pinus banksiana</i>	15-20	30-40/15	15-20	35-45/15	20-30	35-45/15	20-30	35-45/15-20
3	CONIFEROUS TREES	Pine, Limber 1/ <i>Pinus flexilis</i>	10-15	25-40/15	10-15	25-45/15-20	15-20	30-45/15-20	20-25	35-55/15-20
3	CONIFEROUS TREES	Pine, Pinyon (Two needle Pinyon) <i>Pinus edulis</i>	5-10	15-20/15-20	Not Recommended	Not Recommended	Not Recommended	Not Recommended	Not Recommended	Not Recommended
3	CONIFEROUS TREES	Pine, Ponderosa 1/ <i>Pinus ponderosa</i>	15-25	30-50/20	15-30	30-55/20	20-30	35-55/20	20-35	40-60/20

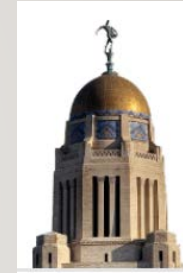
# UNL SCIENCE LITERACY PROJECT ON ERC

- <https://agronomy.unl.edu/eastern-redcedar-science-literacy-project>



# NEBRASKA LEGISLATURE – LR 387

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- Introduced by Hughes from District 44 (located in southwest Nebraska)
- Intended to quantify:
  - Threats posed by spread of ERC
  - Economic loss and Ecological loss from spread
  - Current funding mechanisms for control
  - Liability concerns about prescribed burning
  - Feedback regarding value as windbreak species
  - Costs and challenges of management
- A wide variety of testimonies were provided both noting the impacts of ERC spread and management as well as the need for ERC to be used to address conservation issues on the land
- (As of November 2018) No legislative was requested or planned for 2019



# NELSON'S HYBRID CEDAR-PINE

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- Lower limb density of Eastern red cedar for excellent wind protection
- Upper limb beauty of Austrian pine
- No ERC berry production to prevent spread
- Produces pine cones for use with winter displays and holiday decorations



# WHAT ABOUT NRCS IN NEBRASKA – WHATCHA GONNA DO?

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## ALREADY IMPLEMENTED

- Provided a mechanism to assist through financial programs (i.e. EQIP) on the “very low” density Eastern red cedar – brush management (0-5%)
- Allow financial assistance for installing fabricated windbreaks to avoid using ERC in tree plantings
- Collaborate with partners at UNL on methods to be more effective at control (where, how, etc.)

## IN THE WORKS... BEING CONSIDERED

- Modify the technical and program aspects of brush management to provide assistance for localized eradication where appropriate
- Determine what measures are needed to limit assistance with the planting of ERC into areas where invasion may occur – obtaining input through Local Work Groups

# NRCS IS EVALUATING OUR EQIP COST-SHARE PRIORITIES FOR PLANTING EASTERN RED CEDAR – 5 QUESTIONS

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- What resource concern(s) is/are being addressed by ERC? (Use the resource concern list that NRCS applies to the conservation planning process)
- Can that resource concern be adequately addressed by another species of conservation tree? (For example, if reduced wind erosion or improved snow distribution across a field is the objective, can another species accomplish that function?)
- If an evergreen is necessary to accomplish the desired outcome, what alternative species exist to replace ERC? (R.M. juniper, ponderosa pine, jack pine, etc.)
- How do the issues listed above vary from one portion of the NRD to another? (For example, are there different resource concerns in cropland dominated areas vs. rangeland areas vs. woodlands or riparian corridors?)
- What other program adaptations can be used to facilitate reducing the use of ERC in tree plantings? (For example, financial assistance for the construction of fabricated windbreaks, or increased payment rates for potted pine species or animal protection devices, etc.)



# INNOVATION AND INGENUITY

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- Can we think outside the box for solutions?
- Do we always need to capture lightning in a bottle?  
Or, will a cardboard box suffice?

- **QUESTIONS**

- **DISCUSSION**

