

Wildlife-Friendly Erosion Control



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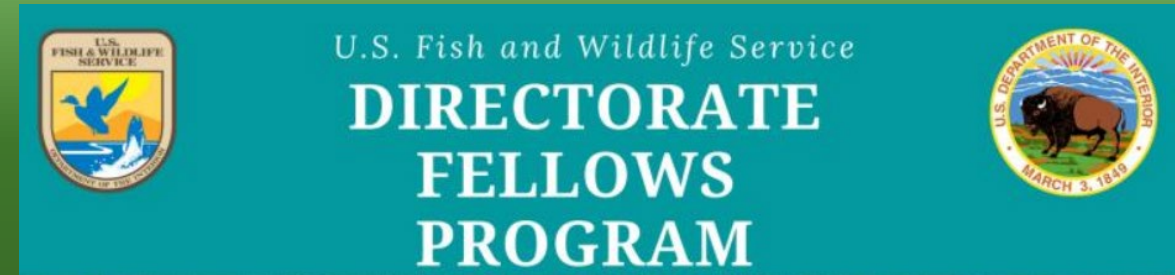
Issues

Solutions

Discussion

Introduction – about me

- Bachelor of Science (UMF)
 - Wildlife Biology
- Master of Science (UMF)
 - Wildlife Biology
 - GIS Certificate (UMF)
- Ph.D. Candidate (MSU)
 - Fisheries & Wildlife
 - Ecology, Evolution, Behavior
- Graduate Certificates (MSU)
 - College Teaching
 - Spatial Ecology
- Lecturer UM-Flint since 2017
- Elected positions TWS



Introduction – Erosion Control & Wildlife

Soil Erosion



Wind Erosion



Sheet & Rill Erosion



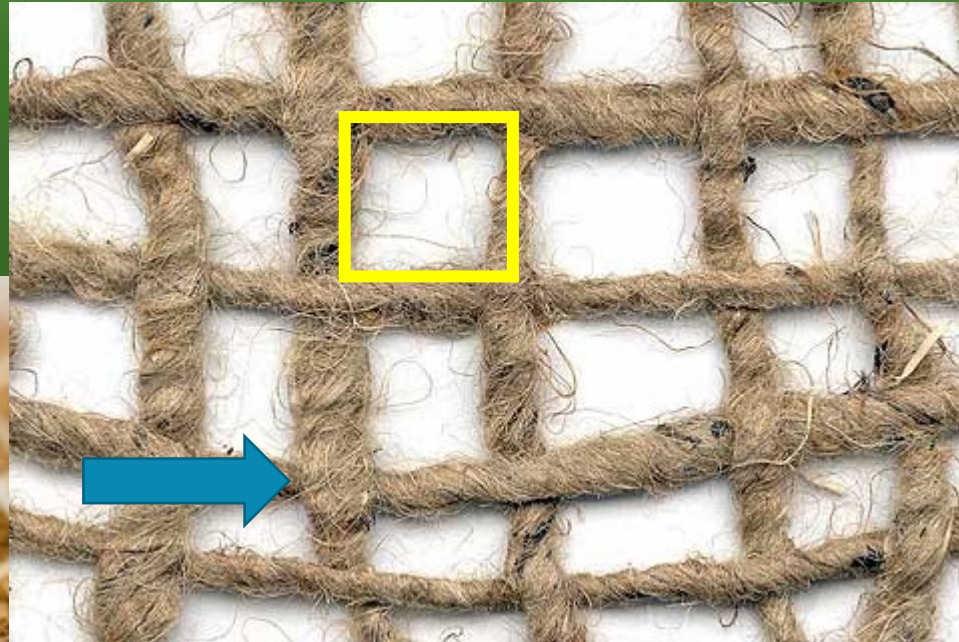
Stream Bank Erosion



Gully Erosion

- Protect the soil without harming wildlife
- Erosion Control Products = ECPs
 - Wildlife entanglement = injury/death ~ Type of ECPs
 - Ingestion of plastic & plastic pollution ~ Type of ECPs

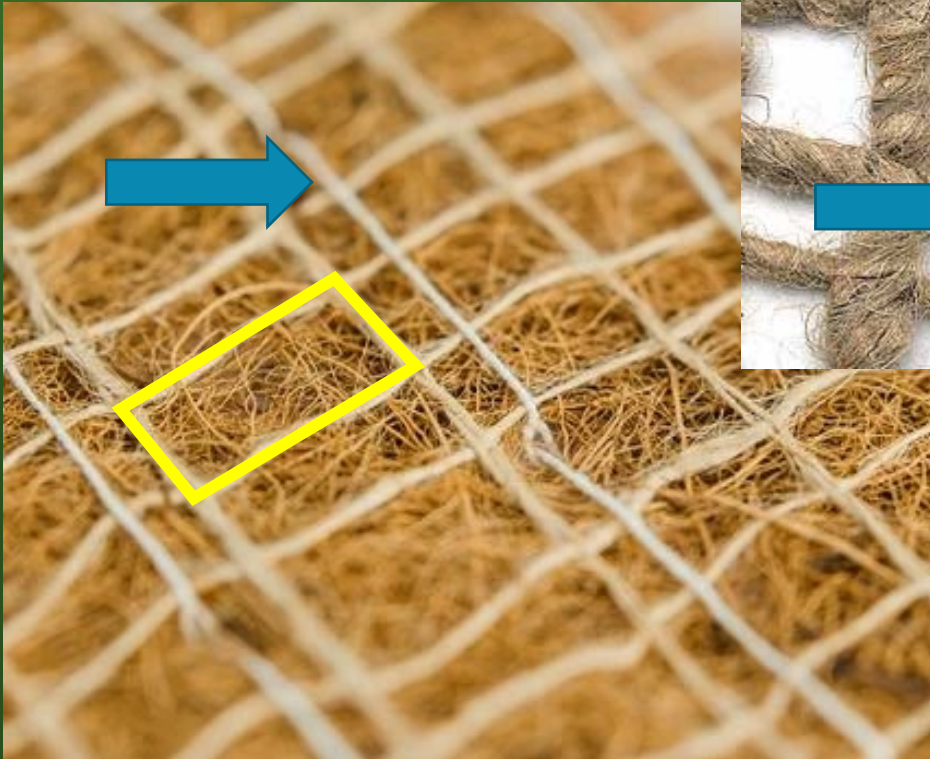
Erosion control netting 101



<https://www.emeraldseedandsupply.com/photos/JuteNet.jpg>



https://www.emeraldseedandsupply.com/photos/erosioncontrol/ec_coconutblanket_m.jpg



https://cdn.shopify.com/s/files/1/0043/5716/0995/products/ECC-2B_427x349.jpg?v=1587142505

Erosion control netting 101



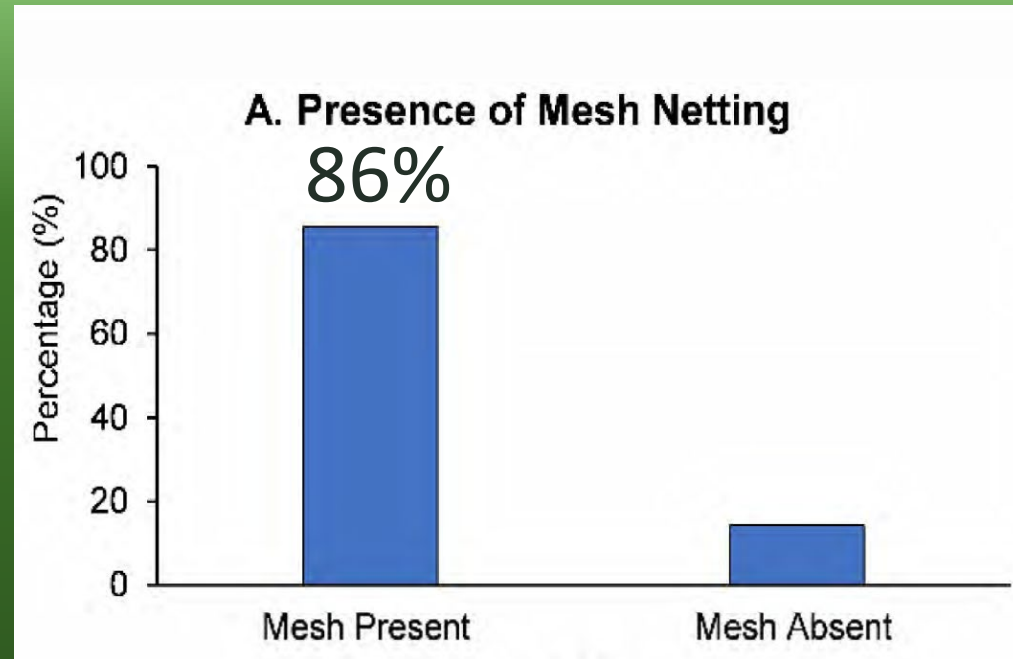
<https://www.erosioncontrol-products.com/image-files/silt-fencing-table.jpg>



https://www.clarionmunicipal.com/images/resource/products/erosion-control-matting_370x415.jpg

Erosion Control Products = ECPs

- Spray mulches
- Netting
- Blankets
- Mats
- Wattles
- Reinforced fencing



Jobe, K., Schiwitz, N. C., Ward, K., Saenz, D., & Schalk, C. M. (2020). On the Diversity of Erosion Control Products: Implications for Snake Entanglement.





Photo Via Christopher Smith, courtesy of Trevor Riedemann: <https://twitter.com/fieldecology/status/1245023778796683267>

Wildlife entanglement & death



USFWS photo

Reptiles and Amphibians



- Eastern Fox Snake (*Pantherophis gloydi*)
- Gray Rat Snake (*Pantherophis spiloides*)
- Butler's Garter Snake (*Thamnophis butleri*)
- Eastern Massasauga Rattlesnake (*Sistrurus catenatus*)

Plastic Netting: An Entanglement Hazard to Snakes and Other Wildlife

- Coachwhips (*Masticophis flagellum*)
- Bullsnares (*Pituophis catenifer*)
- Western diamondback rattlesnakes (*Crotalous atrox*)
- Racers (*Coluber constrictor*)
- Ratsnakes (*Elaphe obsoleta*)
- Kingsnakes (*Lampropeltis getula*)
- Spiny lizards (*Sceloporus magister*)

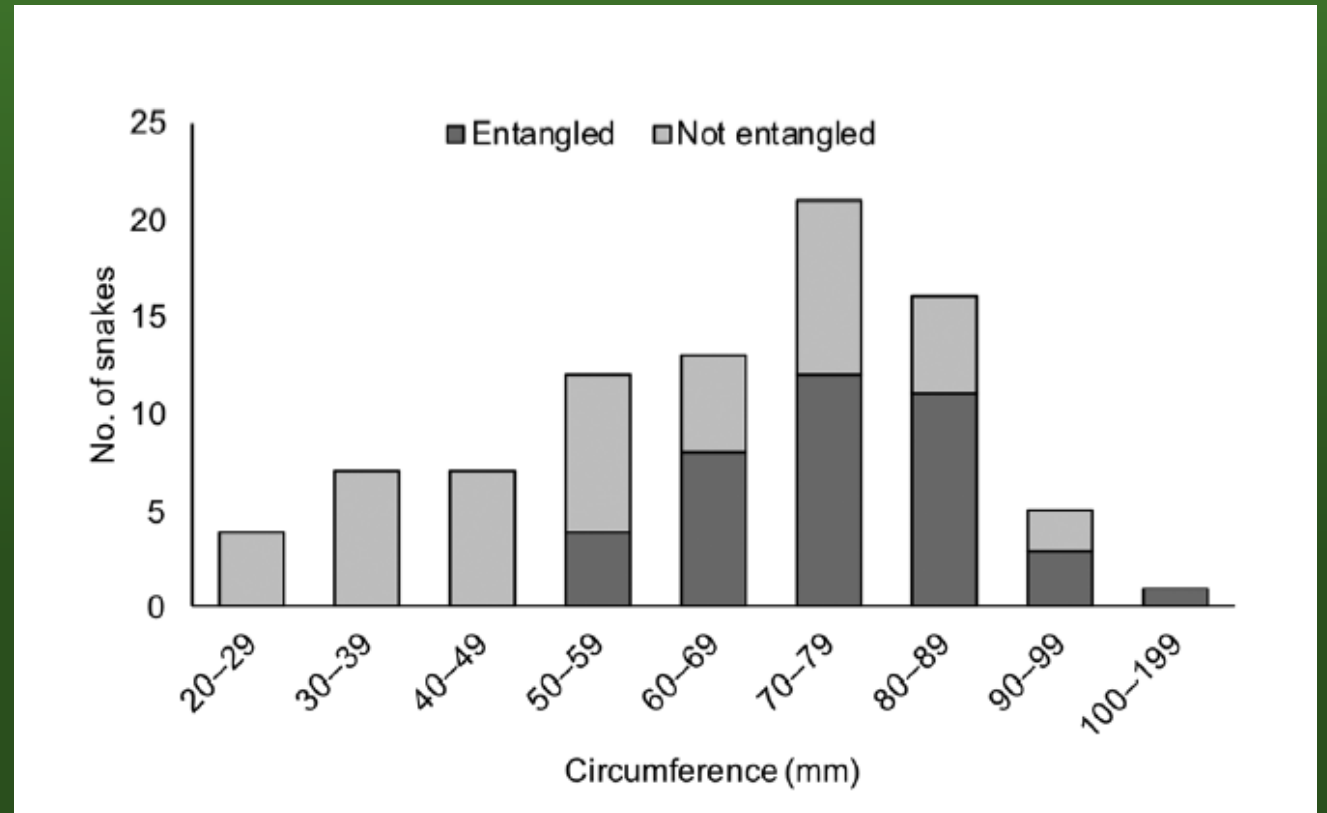
Stuart, J. N., Watson, M. L., Brown, T. L., & Eustice, C. (2001). Plastic netting: An entanglement hazard to snakes and other wildlife. *Herpetological Review*, 32(3), 162-164.



More entanglement

1. 60% of restoration sites

2. Snakes and mesh size



Testing for entrapment



Sarah Fuller video credit

https://www.youtube.com/watch?v=jLso_y1Tbz4

Issues for Birds

A struggling hawk enmeshed in landscape netting was freed by a good Samaritan

By MARY REID BARROW
CORRESPONDENT | MAY 29, 2016 AT 5:31 PM



LATEST WILDLIFE & NATURE



https://www.pilotonline.com/life/wildlife-nature/article_c6725ee4-25e4-11e6-be3c-b74900fe2150.html



Photo courtesy of Randy Loftus,
USFWS



Photo Courtesy of Peter McGowan, USFWS

States using wildlife friendly ECPs



California Coastal Nonpoint Source Program

Water Quality Fact Sheet

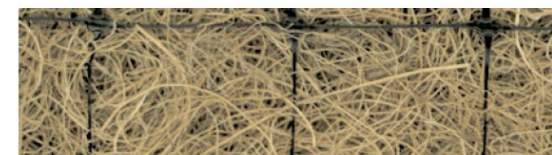
Wildlife-Friendly Plastic-Free Netting in Erosion and Sediment Control Products



Snake entangled in an erosion control blanket's plastic netting.
(Photo by Mark Backus).



Coir mulch control netting



Close-up of jute mulch control netting

Illinois DNR



Biology Fact Sheet

Indiana - October 2013 (ver. 1.0)

Guidelines for Use of Snake-Friendly Erosion Control Blankets



For NRCS projects in Indiana

The Threatened and Endangered snake species in Indiana that are covered by this policy presently include:

- | | | |
|--------------------------------------|----------------------|------------------------|
| • Butler's Garter Snake | • Kirtland's Snake | • Timber Rattlesnake |
| • Copperbelly Water Snake (T) | • Rough Green Snake | • Western Cottonmouth |
| • Eastern Massasauga Rattlesnake (T) | • Smooth Green Snake | • Western Ribbon Snake |

(T) = Federally Threatened

Minnesota DNR fact sheet



A small vole that was strangled and killed by plastic erosion-control material with welded and square mesh. Photo taken in Minnesota and provided courtesy of Tom Jesse.



Plains Gartersnake trapped and killed by welded-plastic square erosion-control mesh placed along a newly installed cement culvert in southern Minnesota. ©MN DNR, Carol Hall



Fish trapped and killed by welded-plastic square erosion-control mesh improperly placed along a small central Minnesota stream. Photo courtesy of Ben Lowe.

VTrans requires the use of wildlife-friendly ECM for all temporary ECM applications:

WILDLIFE-FRIENDLY EROSION CONTROL MATTING • THE STANDARD FOR VERMONT •

Chris Slesar, Environmental Specialist, Vermont Agency of Transportation

Section 755 – Landscaping Materials

755.11 Erosion Matting, Is hereby modified by being deleted in its entirety and replaced with the following:

(a) Temporary Erosion Matting. Temporary erosion matting shall conform to one of the following specifications and corresponding properties found in Table 755.11A

1) Mulch Control Netting. A temporary biodegradable rolled erosion control product (RECP) composed of planar woven natural fiber.

(2) Erosion Control Blanket. A temporary all natural biodegradable rolled erosion control product composed of processed fibers mechanically bound together to form a continuous matrix.

(VTrans Standard Specifications 2009)

05.29.2009

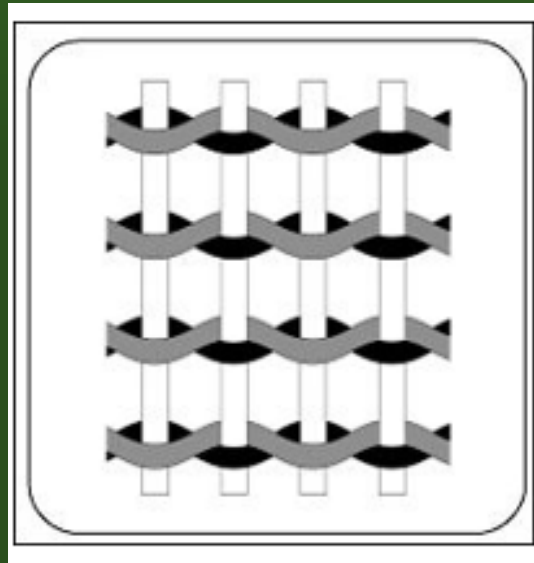
Photo: Andrea Wright

**Wisconsin Department of Natural Resources
Technical Standard
Channel Erosion Mat
1053**

<https://dnr.wi.gov/topic/stormwater/documents/1053ChannelErosionMat.pdf>

CONSIDERATIONS

Some erosion mat products can have detrimental effects on local wildlife. Plastic netting without independent movement of strands can easily entrap small animals moving through the area, leading to dehydration, desiccation, and eventually mortality. Netting that contains biodegradable thread with the “leno” or “gauze” weave (contains strands that can move independently) have the least impact on wildlife.



Source: Vanessa Metz, California Coastal Program

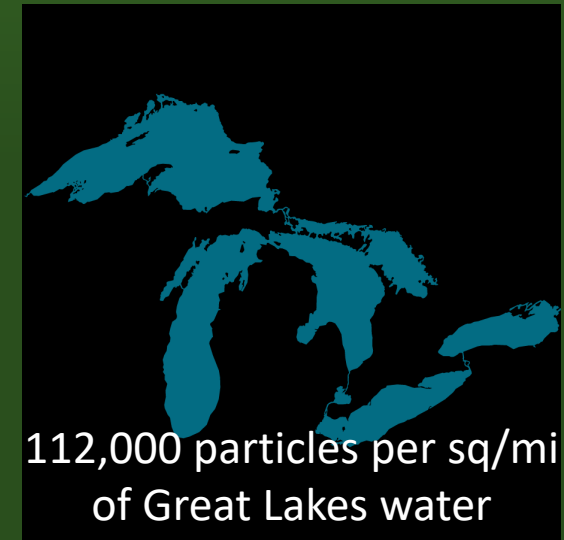
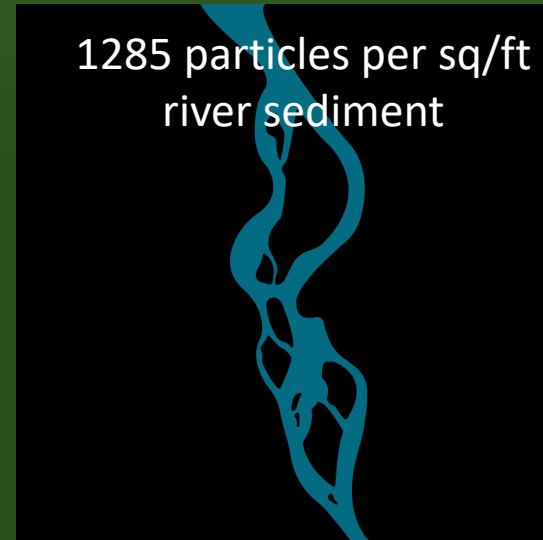
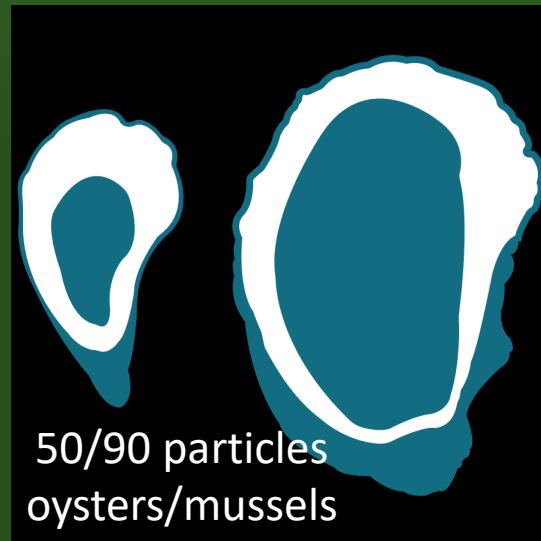
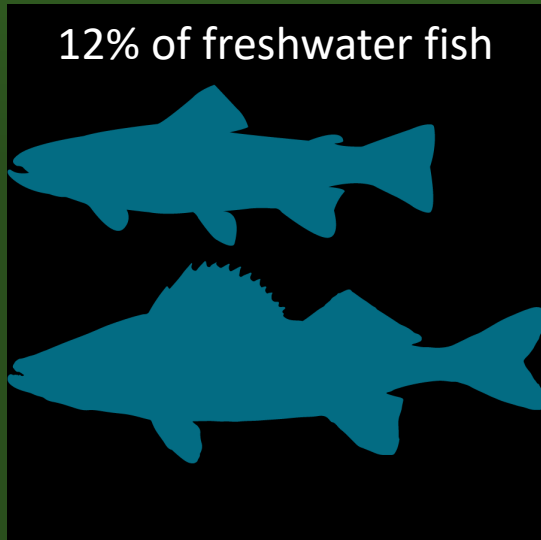
Michigan

- Since 2017, the USFWS has recommended wildlife-safe erosion control materials throughout the range of the eastern massasauga (federally threatened species)



Microplastics in water


- Sediment toxicity of bottom dwelling invertebrates
- Bioaccumulates up the food chain
- Fibers and fragments in aquatic organisms



Plastics

Water Air Soil Pollut (2020) 231: 405
<https://doi.org/10.1007/s11270-020-04741-5>

Investigation of Microplastics in Freshwater Mussels (*Lasmigona costata*) From the Grand River Watershed in Ontario, Canada

C. Wardlaw • R. S. Prosser 



<https://oceanservice.noaa.gov/podcast/sep20/nop39-microplastic-mussels-part-one.html>



<https://labs.waterdata.usgs.gov/visualizations/microplastics/index.html>

Other factors

- Dissatisfied public
 - Kids in a nature
 - Unhappy nature enthusiasts

Time and money wasted

A total waste of money, all of them failed and are now a big mess.



<http://www.bobseyes.net/too-much-plastic-required-for-erosion-control/>

Now What?

- What we know
- What we can learn from it
- Example products & scientific literature recommendations

NOT WL friendly

- Square plastic netting that is:
 - Degradable
 - Photodegradable
 - UV-degradable
 - Oxo-degradable
 - Oxo-biodegradable
- Remove all of them when finished/don't leave to pollute
- Usually once veg starts you should be good (promote veg growth)



NOT WL friendly

- Made from:
 - Polypropylene
 - Nylon
 - Polyethylene
 - Polyester



Trinet Curlex side 1. Aspen excelsior contains standard polypropylene netting on both sides (0.5 in * 0.5 in) welded joints, heavy duty, and UV stabilized. Slopes $\leq 5H:1V$, Channels 13 lb/ft² (622 Pa) shear stress, 20.0 ft/s (6.1 m/s) velocity. Seed free Permanent reinforcement, also available in natural straw/coconut, natural coconut, Recyclex synthetic fibers with the same netting. Not wildlife friendly.

NOT WL friendly

- Silt fences reinforced with metal or plastic mesh



Check erosion control areas for entangled wildlife

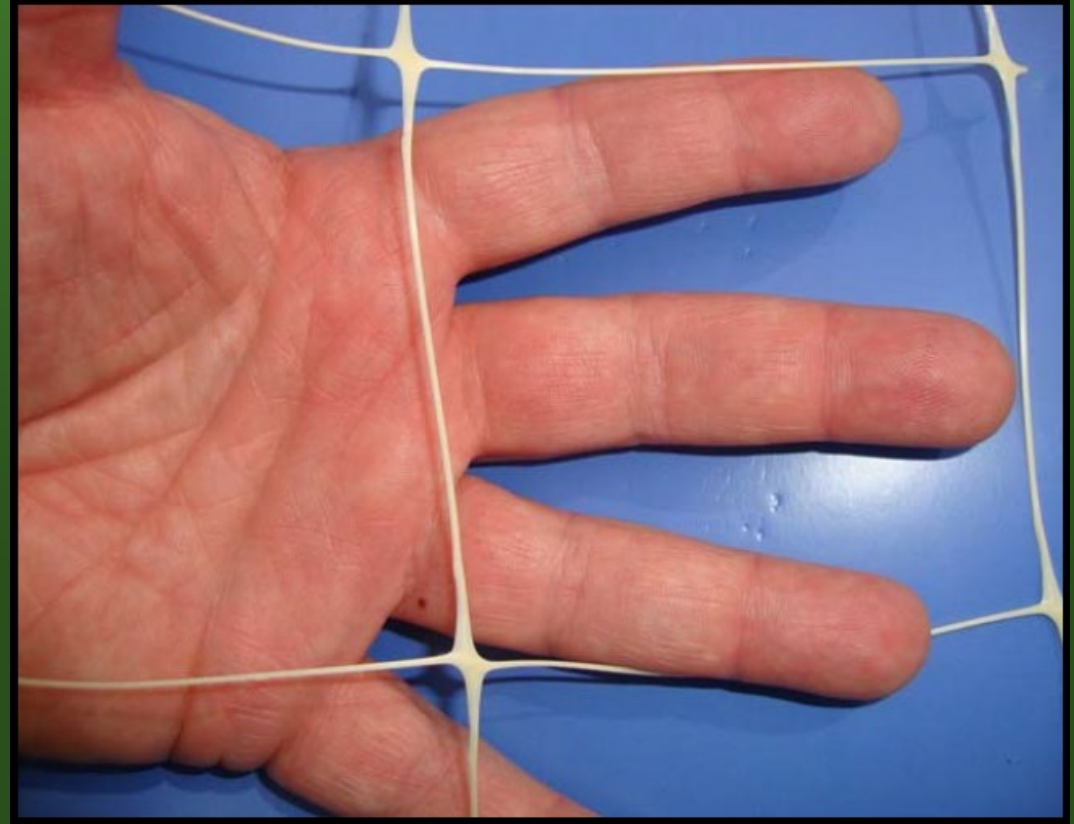
- Walk perimeters
- Georgia DNR rescues rat snakes:



<https://content.govdelivery.com/accounts/GADNR/bulletins/1fe6657>

Somewhat better products

- Mesh greater than 2.54cm



Herpetological Resource & Management, 2019



Somewhat better products

- Elongated mesh (rectangles not squares)

But you still do not need to use the polypropylene products because.....

Curlex I. Aspen excelsior contains standard polypropylene netting on one side (2 in * 1 in) welded joints, oxo-biodegrader, and UV additives. Slopes \leq 2H:1V, Channels 1.75 lb/ft² (84 Pa) shear stress, 7.0 ft/s (2.1 m/s) velocity. Seed free. Somewhat wildlife friendly.



Wildlife friendly ECPs

- 100% biodegradable materials

Choose the product with
FibreNet instead!



Curlex I. Aspen excelsior contains FibreNet netting on one side (1in * 0.5 in) jute with moveable joints. Slopes \leq 2H:1V, Channels 1.75 lb/ft² (84 Pa) shear stress, 7.0 ft/s (2.1 m/s) velocity. True biodegradable, seed free. Mowable 90 days. Wildlife friendly.

Wildlife friendly ECPs

- Loose weave
- Non welded
- Movable joints
- Labeled leno or gauze
- Made from natural materials
- Can leave = biodegradable



<https://dot.ca.gov/programs/design/lap-erosion-control-design/tool-1-lap-erosion-control-toolbox/tool-1o-15-recp-jute-mesh>

Wildlife friendly ECPs

- Natural fiber with no netting

Curlex NetFree. Aspen excelsior contains no netting. Slopes \leq 3H:1V, Channels 1.0 lb/ft² (48 Pa) shear stress, 3.0 ft/s (0.9 m/s) velocity. True biodegradable, seed free. Wildlife friendly.





Curlex II. Aspen excelsior contains FibreNet netting on two sides (1in * 0.5 in) jute with moveable joints. Slopes $\leq 1.5H:1V$, Channels 2.25 lb/ft² (108 Pa) shear stress, 9.0 ft/s (2.7 m/s) velocity. True biodegradable, seed free. Movable in 90 days. Wildlife friendly.

More Wildlife Friendly ECPs



Curlex III. Aspen excelsior contains FibreNet netting on two sides (1in * 0.5 in) jute with moveable joints. Slopes $\leq 1H:1V$, Channels 2.5 lb/ft² (120 Pa) shear stress, 10.0 ft/s (3.1 m/s) velocity. True biodegradable, seed free. Movable in 90 days. Wildlife friendly.

Notes

Risk of Snake Entanglement Is Affected by Installation Method of Erosion Control Blankets

Krista J. Ward,* Kasey L. Jobe, Nicholas C. Schiwitz, Daniel Saenz, Christopher M. Schalk

- Bury edges of blankets and mats
- Buried edges help prevent WL from getting under the blanket/mat

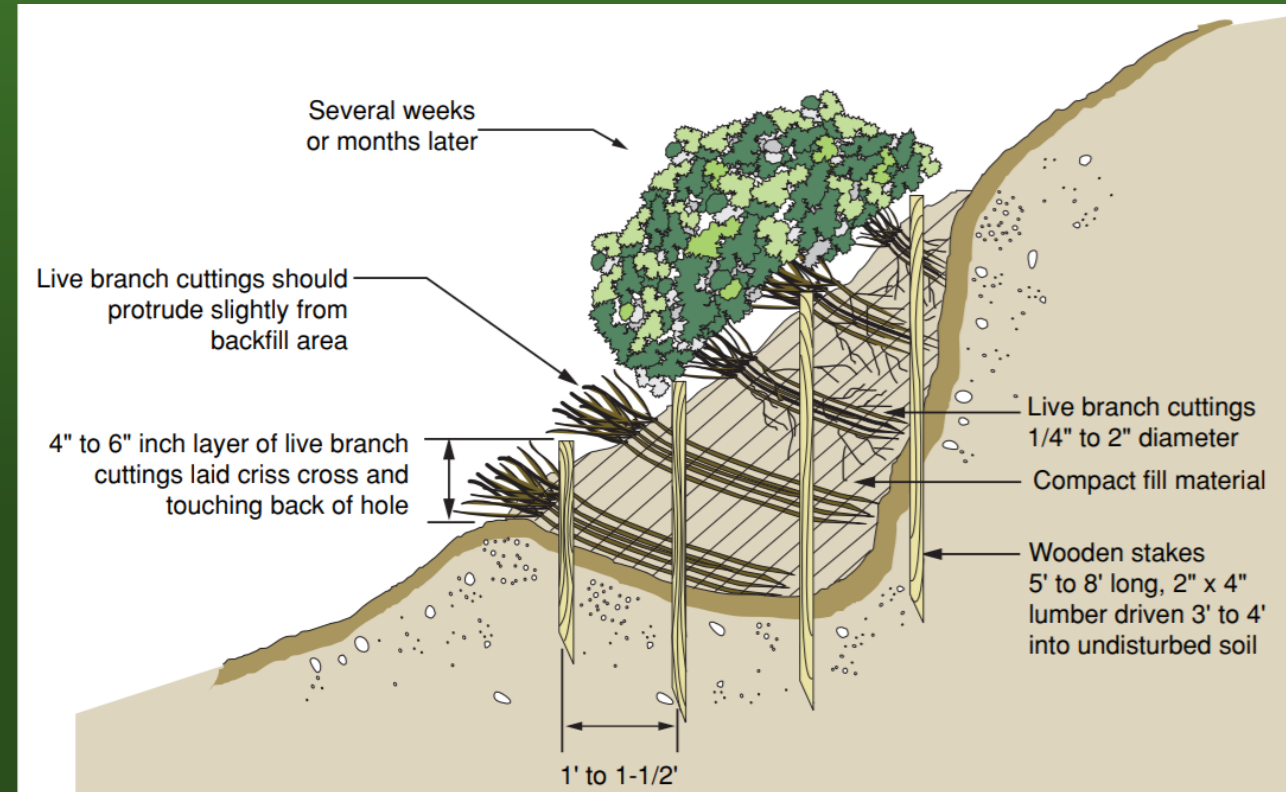
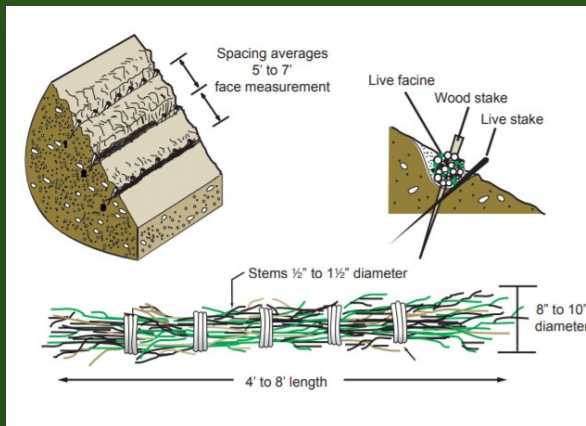
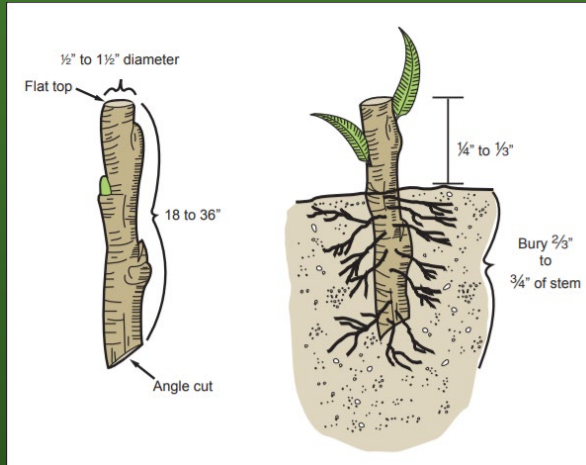
Species	Number of individual snakes	Buried edges			Exposed edges		
		Number of individual snakes attempting	Total number of attempts	Number of snakes entangled	Number of snakes attempting	Total number of attempts	Number of snakes entangled
Eastern racer <i>Coluber constrictor</i>	20	3	7	0	16	33	6
Coachwhip <i>Coluber flagellum</i>	7	1	1	0	6	10	3
Western mud snake <i>Farancia abacura</i>	1	0	0	0	0	0	0
Eastern hognose snake <i>Heterodon platirhinos</i>	3	0	0	0	3	4	2
Prairie kingsnake <i>Lampropeltis calligaster</i>	1	0	0	0	1	1	0
Speckled kingsnake <i>Lampropeltis holbrooki</i>	1	0	0	0	1	2	0
Glossy swampsnake <i>Liodytes rigida</i>	1	1	4	0	1	1	0
Plain-bellied water snake <i>Nerodia erythrogaster</i>	9	0	0	0	7	9	3
Broad-banded water snake <i>Nerodia fasciata</i>	2	0	0	0	2	2	1
Diamond-backed water snake <i>Nerodia rhombifer</i>	2	0	0	0	2	5	0
Western ratsnake <i>Pantherophis obsoletus</i>	33	2	2	0	20	31	3
Western ribbonsnake <i>Thamnophis proximus</i>	11	1	1	0	10	30	0
Total	91	8	15	0	69	128	18

Wildlife friendly ECPs - Spray on mulch

- Using too much = slows native plant germination
- Using too little = failure
- Toxicity reports show they are not harmful for fish



Wildlife friendly ECPs - Native vegetation & stakes



Conclusion

Not Wildlife Friendly

- Square plastic netting that is:
 - Degradable
 - Photodegradable
 - UV-degradable
 - Oxo-degradable
 - Oxo-biodegradable
- Made from:
 - Polypropylene
 - Nylon
 - Polyethylene
 - Polyester
- ECPs left longer than needed
- Silt fences reinforced with metal or plastic mesh

Less Risk to Wildlife

- Elongated mesh netting
- Mesh > 2.54 cm

Wildlife Friendly

- Natural fiber netting or no netting
- 100% biodegradable materials
- Loose weave, non-welded, movable jointed netting (leno or gauze)
- Secure ECPs with wooden stakes or live stakes
- Bury edges of blankets & mats
- Remove ECPs when no longer needed
- Spray on mulch
- Seed & plant native vegetation

Actions you can take

Use wildlife friendly ECPs

Update standards & policies:

Promote wildlife friendly ECPs

Do not use plastic netting

Collaborate & reach out to change policy!



<https://i.imgur.com/MZCKhYE.jpg>

Example Language for a Local Coastal Program Update

❖ The Coastal Commission Water Quality Program's model water quality component of an LCP update:

Avoid plastic netting in temporary rolled erosion and sediment control products. During construction, development shall avoid the use of temporary rolled erosion and sediment control products (such as fiber rolls, erosion control blankets, and mulch control netting) that incorporate plastic netting (such as polypropylene, nylon, polyethylene, polyester, or other synthetic fibers), to minimize wildlife entanglement and plastic debris pollution. Acceptable alternatives include the following:

- (1) Loose-weave natural fiber netting.** Temporary rolled erosion and sediment control products with netting made of natural fibers, constructed in a loose-weave design with movable joints between the horizontal and vertical twines.
- (2) Erosion control products without netting.** Temporary rolled erosion and sediment control products that do not contain netting, including net-less erosion control blankets (e.g., made of excelsior), loose mulch, hydraulic mulch, soil binders, and straw bales.
- (3) Unreinforced silt fences.** Silt fences constructed of woven synthetic filter fabric; however, avoid the use of reinforced silt fences backed by plastic or metal mesh.

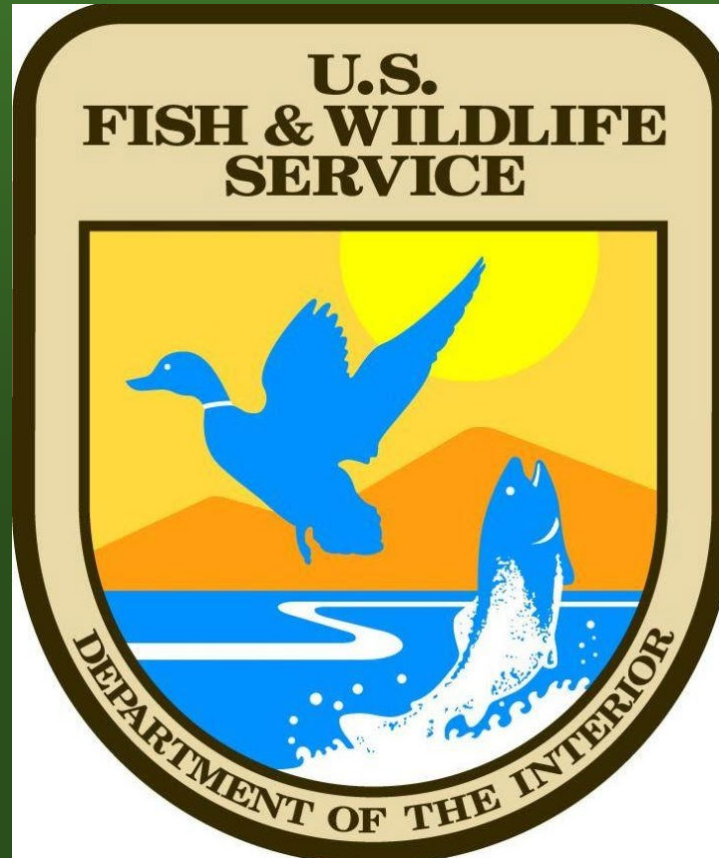
Things to help you

- This webinar
- More information:
 - White paper
 - One page fact sheet
- Table of wildlife safe products
 - various conditions (slope, etc) that are wildlife friendly from multiple manufacturers
- What else could we do to make this easier?



<https://favim.com/orig/201105/20/bird-happy-laugh-owl-smile-Favim.com-50319.jpg>

THANK YOU!!!



- Carrie Tansy
- Jessica Pruden
- Shaughn Galloway
- Michigan Field office
- Jeff Grabarkiewicz & Kelsey Buchmayer; MDOT
- Directorate Fellows Program

Discussion

- If we don't get to your question today, we can make a note and get back to you!

QUESTIONS?

- Contact:
 - Melissa_Starking@fws.gov
 - Carrie_Tansy@fws.gov
- Website:
 - <https://fws.gov/midwest/eastlansing/ecp.html>

