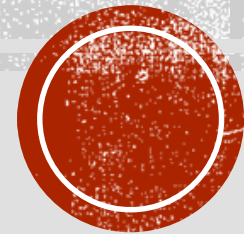


**THREATENED &  
ENDANGERED SPECIES  
UPDATE**



# ENDANGERED SPECIES ACT

- Requires regulators to consider potential effects on T&E species during permitting process
- Must evaluate whether they are present
- If present, will there be any effects?
- Each plant or animal type has particular set of rules about when protective measures need to be placed in permit
  - Terrestrial species typically only require protections when present within footprint of activity or within a buffer zone of habitat features (roost trees, hibernacula, etc.)
  - Aquatic species require protections if project is within a certain distance upstream and/or if the project disturbs an upstream drainage area greater than a given size



# THREATENED AND ENDANGERED SPECIES IN WV



# 26 THREATENED AND ENDANGERED SPECIES OF PLANTS AND ANIMALS IN WEST VIRGINIA

Species	Scientific Name
<b>Eastern cougar</b>	<i>Felis concolor cougar*</i>
<b>Indiana bat</b>	<i>Myotis sodalis</i>
<b>Virginia big-eared bat</b>	<i>Corynorhinus townsendii virginianus</i>
<b>Northern long-eared bat</b>	<i>Myotis septentrionalis</i>
<b>Cheat Mountain salamander</b>	<i>Plethodon nettingi</i>
<b>Diamond darter</b>	<i>Crystallaria cincotta</i>
<b>Madison Cave isopod</b>	<i>Antrolana lira</i>



# 26 THREATENED AND ENDANGERED SPECIES OF PLANTS AND ANIMALS IN WEST VIRGINIA

<b>Species</b>	<b>Scientific Name</b>
<b>Clubshell mussel</b>	<i>Pleurobema clava</i>
<b>Fanshell mussel</b>	<i>Cyprogenia stegaria</i>
<b>James spiny mussel</b>	<i>Pleurobema collina</i>
<b>Pink mucket mussel</b>	<i>Lampsilis abrupta</i>
<b>Rayed bean mussel</b>	<i>Villosa fabalis</i>
<b>Sheepnose mussel</b>	<i>Plethobasus cyphus</i>
<b>Spectaclecase mussel</b>	<i>Cumberlandia monodonta</i>



# 26 THREATENED AND ENDANGERED SPECIES OF PLANTS AND ANIMALS IN WEST VIRGINIA

<b>Species</b>	<b>Scientific Name</b>
<b>Snuffbox mussel</b>	<i>Epioblasma triquetra</i>
<b>Tubercled blossom pearly mussel</b>	<i>Epioblasma torulosa torulosa</i>
<b>Guyandotte River crayfish</b>	<i>Cambarus veteranus</i>
<b>Big Sandy crayfish</b>	<i>Canbarus callainus</i>
<b>Flat-spired three toothed land snail</b>	<i>Triodopsis platysayoides</i>
<b>Harperella</b>	<i>Ptilimnium nodosum</i>
<b>Northeastern bulrush</b>	<i>Scirpus ancistrochaetus</i>



# 26 THREATENED AND ENDANGERED SPECIES OF PLANTS AND ANIMALS IN WEST VIRGINIA

Species	Scientific Name
Running buffalo clover	<i>Trifolium stoloniferum</i>
Shale barren rock cress	<i>Boechera serotina</i>
Small whorled pogonia	<i>Isotria medeoloides</i>
Virginia spiraea	<i>Spiraea virginiana</i>
Gray bat	<i>Myotis grisescens</i>
Rusty Patched Bumble Bee	<i>Bombus affinis</i>





## JUST THE BEGINNING:

ON APRIL 20, 2010 THE CENTER FOR BIOLOGICAL DIVERSITY (CBD) PETITIONED THE SERVICE TO LIST 404 SPECIES OF AQUATIC, RIPARIAN AND WETLAND PLANTS AND ANIMALS

SEVERAL SPECIES FROM THE PETITION EXIST HERE IN WV AND ON SEPTEMBER 1, 2016 THE USFWS RELEASED A 7 YEAR PLAN TO REVIEW THE FOLLOWING 29 SPECIES:





# 29 PETITIONED SPECIES BY THE CENTER FOR BIOLOGICAL DIVERSITY IN WV

<b>Species</b>	<b>Scientific Name</b>	<b>Proposed FY Timeframe</b>
<b>Candy darter</b>	<i>Etheostoma osburni</i>	FY17
<b>Hellbender</b>	<i>Cryptobranchus alleganiesis</i>	FY18
<b>Longsolid (mussel)</b>	<i>Fusconaia subrotunda</i>	FY18
<b>Round hickorynut (mussel)</b>	<i>Obovaria subrotunda</i>	FY18
<b>Brook floater (mussel)</b>	<i>Alasmidonta varicosa</i>	FY18
<b>Elk River crayfish</b>	<i>Cambarus elkensis</i>	FY18
<b>Tippecanoe Darter</b>	<i>Etheostoma tippecanoe</i>	FY18



# 29 PETITIONED SPECIES BY THE CENTER FOR BIOLOGICAL DIVERSITY IN WV

<b>Species</b>	<b>Scientific Name</b>	<b>Proposed FY Timeframe</b>
<b>Yellow banded bumblebee</b>	<i>Bombus terricola</i>	FY18
<b>Monarch butterfly</b>	<i>Danaus plexippus</i>	FY19
<b>Cobblestone tiger beetle</b>	<i>Cicindela marginipennis</i>	FY19
<b>Longhead darter</b>	<i>Percina macrocephala</i>	FY19
<b>Cooper's cave amphipod</b>	<i>Stygobromus cooperi</i>	FY20
<b>Green floater (Mussel)</b>	<i>Lasmigona subviridis</i>	FY20
<b>Minute cave amphipod</b>	<i>Stygobromus parvus</i>	FY20
<b>Morrison's cave amphipod</b>	<i>Stygobromus morrisoni</i>	FY20



# 29 PETITIONED SPECIES BY THE CENTER FOR BIOLOGICAL DIVERSITY IN WV

<b>Species</b>	<b>Scientific Name</b>	<b>Proposed FY Timeframe</b>
<b>South Branch Valley cave beetle</b>	<i>Pseudanophthalmus potomaca</i>	FY20
<b>West Virginia spring salamander</b>	<i>Gyrinophilus subterraneus</i>	FY20
<b>Cannulate cave isopod</b>	<i>Caecidotea cannula</i>	FY21
<b>Dry Fork Valley cave beetle</b>	<i>Pseudanophthalmus montanus</i>	FY21
<b>Bluestone sculpin</b>	<i>Cottus sp.</i>	FY22
<b>Regal fritillary</b>	<i>Speyeria idalia</i>	FY22
<b>Golden-winged warbler</b>	<i>Vermivora chrysoptera</i>	FY23
<b>Little brown bat</b>	<i>Myotis lucifugus</i>	FY23



# 29 PETITIONED SPECIES BY THE CENTER FOR BIOLOGICAL DIVERSITY IN WV

<b>Species</b>	<b>Scientific Name</b>	<b>Proposed FY Timeframe</b>
<b>Salamander mussel</b>	<i>Simpsonaias anbigua</i>	FY23
<b>Streamside salamander</b>	<i>Ambystoma barbouri</i>	FY23
<b>Frosted elfin butterfly</b>	<i>Calliphrys irus</i>	FY23
<b>Northern red-bellied cooter</b>	<i>Pseudemys rubriventris</i>	FY23
<b>Spotted turtle</b>	<i>Clemmys guttata</i>	FY23
<b>Wood turtle</b>	<i>Glyptemys insculpta</i>	FY23



**COMMONLY ENCOUNTERED  
FEDERALLY LISTED SPECIES  
IN WV MINING PERMITTING**





# INDIANA BAT (MYOTIS SODALIS)

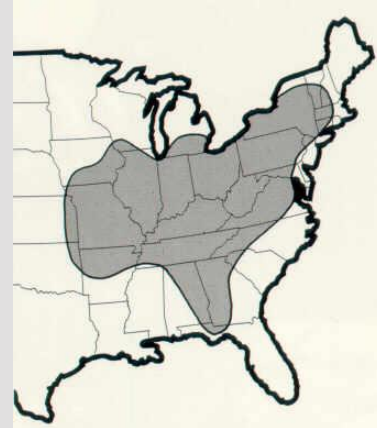
- Federally listed as endangered in 1973
- Hibernates during winter in caves with cool humid but with stable temps < 50 F but above freezing
- Hibernates for 6 months and survive off of stored fat
- After hibernation, migrate to summer habitat where they roost under loose tree bark of dead-dying trees
- Males roost alone, females roost in maternity colonies of up to 100 bats





# INDIANA BAT (MYOTIS SODALIS)

- Females bear 1 pup per year, mothers nurse young
- Young stay with maternity colony for entirety of first summer
- Females only leave roost to feed
- Indiana bats feed on flying insects along rivers, lakes, forest edges and corridors
- Found in few locations across state
- Hellhole caverns designated critical habitat



# DOMINANT THREATS TO INDIANA BAT

- Human disturbance during hibernation
  - Cave can support up to 50,000 bats
- White-nose syndrome (WNS)
  - Fungus ID'd in 2006
  - Added tremendous stress to bat populations, killing up to 90% of infected cave residents
  - Disturbs hibernation leading to starvation
- Summer habitat loss and degradation
  - Problem in WV?





# NORTHERN LONG-EARED BAT (MYOTIS SEPTENTRIONALIS)

- Federally listed as threatened April 2, 2015
- Life history similar to Indiana bats but does not habitually hibernate in large colonies like *M. sodalis*
- Feed primarily in forest understory and edge
- Widespread across eastern U.S. and Canada
- Lifespan up to 18 years
- Are found in every survey conducted state-wide
  - Assume presence



Hibernating northern long-eared bat by Ann Froschauer/USFWS

# DOMINANT THREATS TO NORTHERN LONG-EARED BAT

- White nose syndrome
  - One of most abundant species in WV prior to WNS
  - Dramatic declines in population led to federal listing
- Wind farms
- Summer habitat loss/degradation
  - WV?



# INDIANA BAT

- If project is <40 acres and not within any known T&E buffers, a closure letter will be provided to the applicant
- If project is >40 acres the applicant will be given the option to “Assume Presence” or perform surveys
- If the applicant “Assumes Presence” a Protection and Enhancement Plan (PEP) is required and the *“Range-wide Indiana bat Protection and Enhancement Plan Guidelines for Surface Coal Mining Operations”* should be followed to complete a report





## **PROTECTION AND ENHANCEMENT PLANS (PEP) BATS**

- **Tree Clearing restrictions**
  - October 15 to March 31 within known summer habitat
  - November 15 to March 31 with known hibernacula
- **Provide roosting habitat**
  - Girdling trees >9" dbh
  - Bat boxes or Brandon bark
- **Staged tree removal**
- **Create watering areas or be within ½ of watering areas**
- **PMLU of forestland and 70% or greater reforestation**





# NORTHERN LONG-EARED BAT (4)D RULE

- If an occupied known maternity roost is discovered, no tree clearing shall occur within 150' of the roost tree from June 1 to July 31.
- If a known NLEB hibernacula is discovered no tree clearing within  $\frac{1}{4}$  mile of the hibernacula.



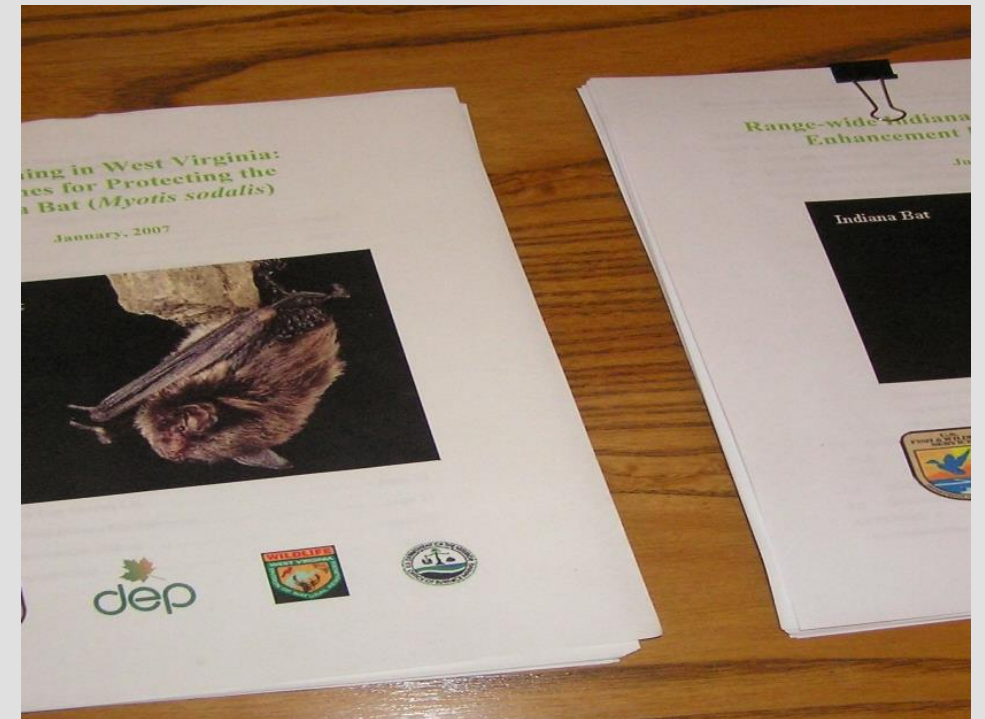
# INDIANA BAT AND NORTHERN LONG-EARED BAT

- If the applicant performs surveys, they must achieve 42 net nights of effort per 123 acres of forested habitat. (\$\$\$\$\$)
- Conduct Acoustic Surveys
  - Detection likely due to technological limitations (*Myotis* spp.)
- All T&E species captured or recorded during survey efforts must be reported within 48 hours to WVDEP, WVDNR and USFWS.
- If listed species found,
  - Produce a PEP
  - “Big C” consultation.
- If no T&E species
  - Report with survey results to WVDEP
  - Closure letter is provided.



# PROTECTION AND ENHANCEMENT PLANS (PEP) BATS

- Herbaceous Ground Cover
- Trees Species Selection
  - Minimum of 6 different species
  - Four must have exfoliating bark
- Travel Corridors
- Restoring Stream Buffer Zones



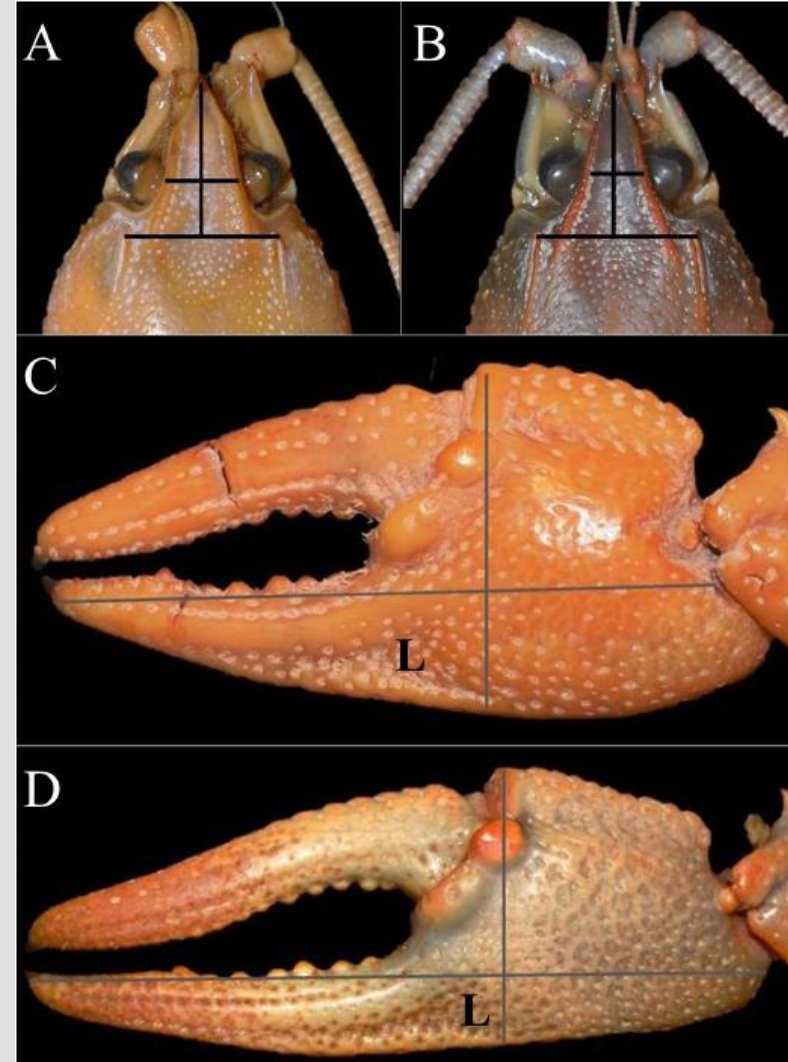
## **PROTECTION AND ENHANCEMENT PLANS (PEP) BATS**

- **Off-site Habitat Mitigation Measures**
  - **No PMLU of Forestland or Fish and Wildlife**
- **Note the PEPs written for the Indiana bat will also protect the NLEB. The “Range-wide Guidelines” are more stringent than the northern long-eared bat (4)d Rule.**



# GUYANDOTTE RIVER AND BIG SANDY CRAYFISH

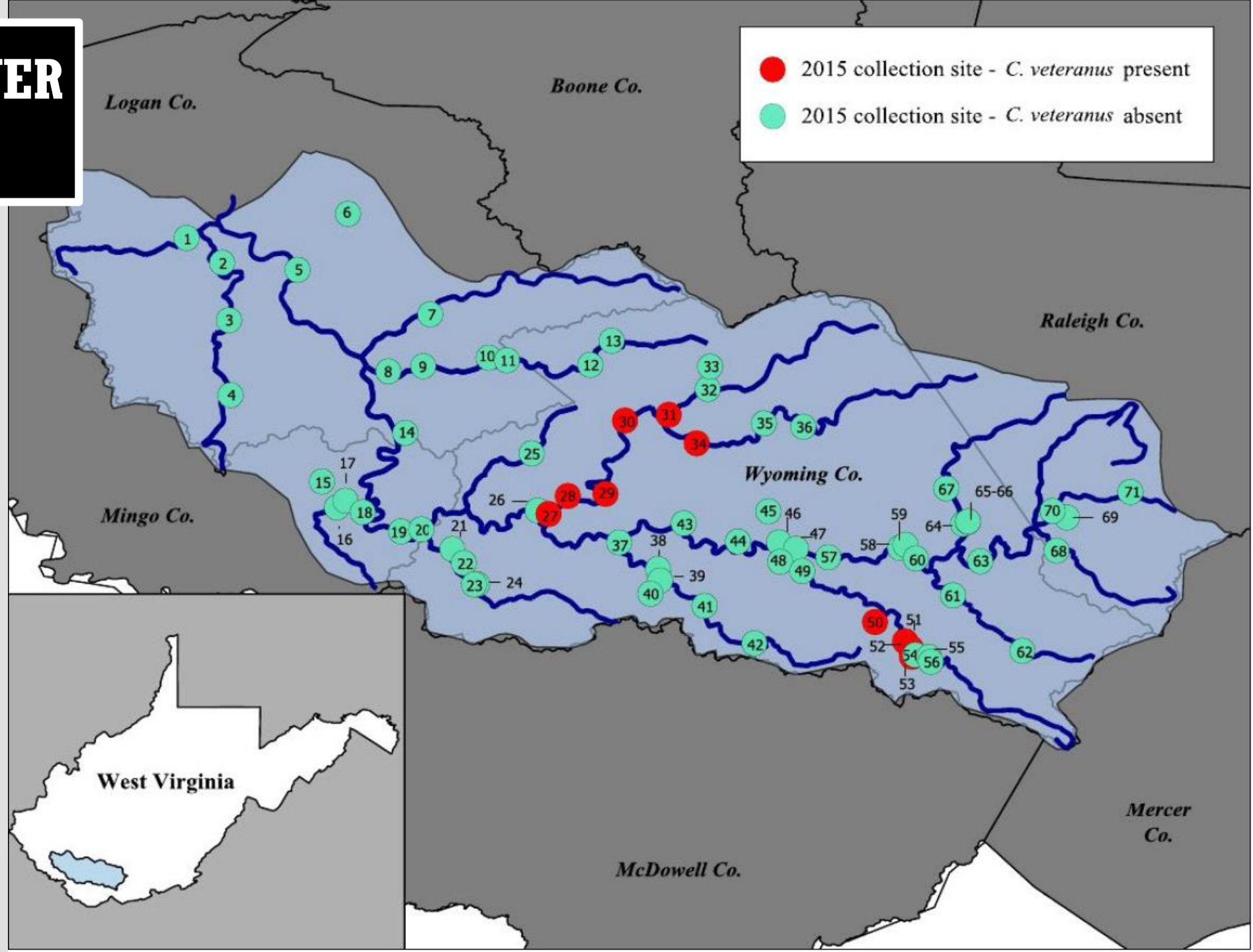
- Considered same species until 2014
- Big Sandy crayfish listed as threatened and Guyandotte River crayfish listed as endangered in May 2016
- Life history requirements are the same
- Morphological and genetic differences are basis for splitting species
- Found in 3<sup>rd</sup> order and larger streams (>12 feet wide)
- Require slab boulder habitat with minimal sedimentation of interstitial spaces
- Opportunistic omnivores/scavengers
- Habitat requirements reliably predict presence to date
- Guyandotte River Crayfish purportedly sensitive to waters with conductance > 460 uS/cm





# GUYANDOTTE RIVER CRAYFISH

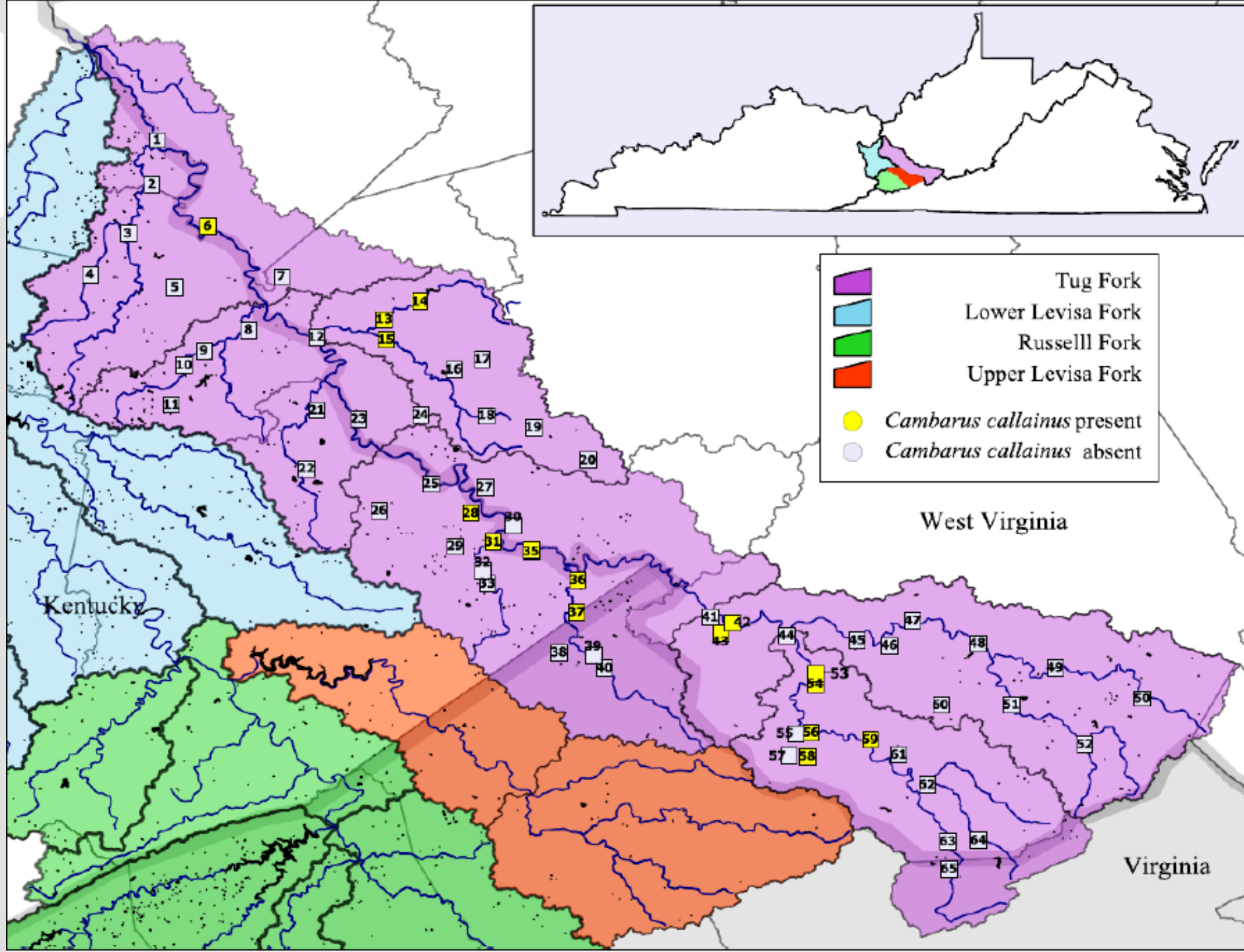
- Clear Fork
- Laurel Fk/Clear Fork
- Pinnacle Creek





# BIG SANDY CRAYFISH

- Tug Fork River
- Pigeon Creek
- Laurel Ck/Pigeon Ck
- Panther Creek
- Dry Fork/Tug Fork River



# DOMINANT THREAT TO THE GUYANDOTTE RIVER AND BIG SANDY CRAYFISH

- Habitat degradation due to sedimentation and embeddedness of stream substrates
- Tertiary burrowing crayfish, must utilize what's available
- Driven by all types of human-driven landuse changes
- Many unregulated or underregulated sources







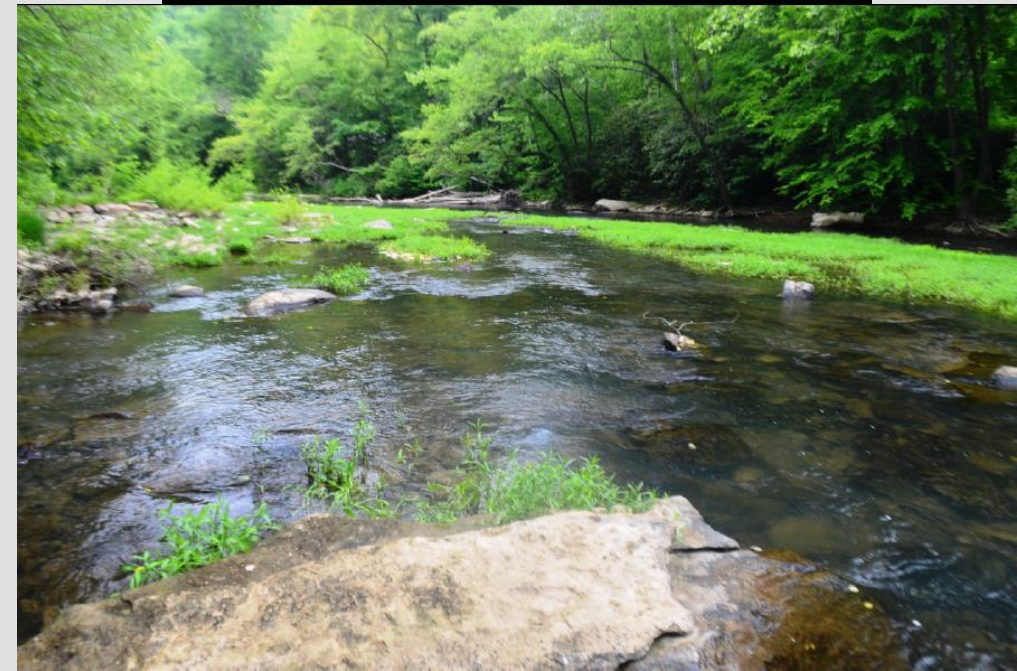
# **DOMINANT THREAT TO THE GUYANDOTTE RIVER AND BIG SANDY CRAYFISH**





# GUYANDOTTE RIVER AND BIG SANDY CRAYFISH

- Ongoing surveys range-wide in 2018 to determine extent of presence of both species
- OSM inspectors in field looking for sediment contributions
- WVDEP-OSM study being initiated to determine turbidity and TSS ranges within Clear Fork/Guyandotte River (Oceana)
  - Identify major contributors of sediment
  - Monitor outlets to quantify contributions





# GUYANDOTTE RIVER AND BIG SANDY CRAYFISH

- Use “Guide to Consideration of Potential Mining-related Impacts on the Guyandotte River and Big Sandy River crayfishes”.
- Habitat Assessment on Third Order and larger Streams.
- Survey Streams with Potential Habitat.



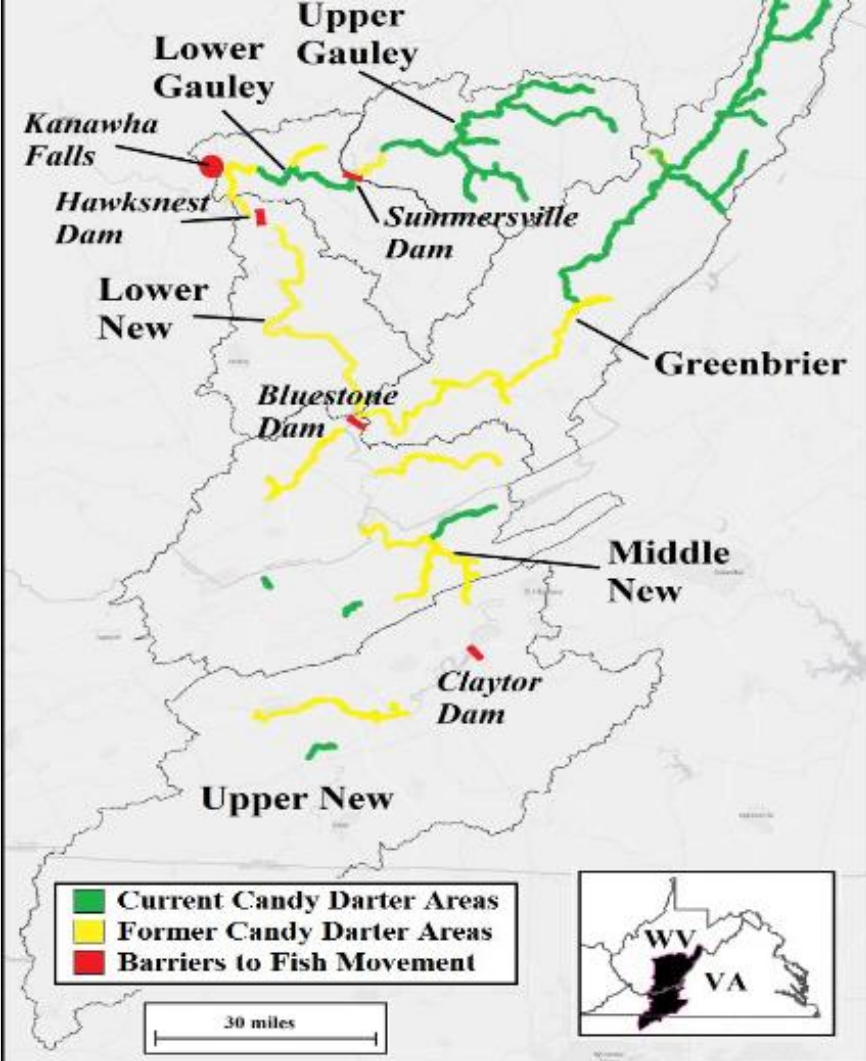


# MUSSELS

- Most mussels are protected within the state of WV whether they are federally listed or not. ALL native populations are protected
- Invasive species are not protected
- Mussel surveys must be performed if the watershed area above the impact point is (10 mi<sup>2</sup>) or larger.
- Surveys can only be done May 1 to October 1







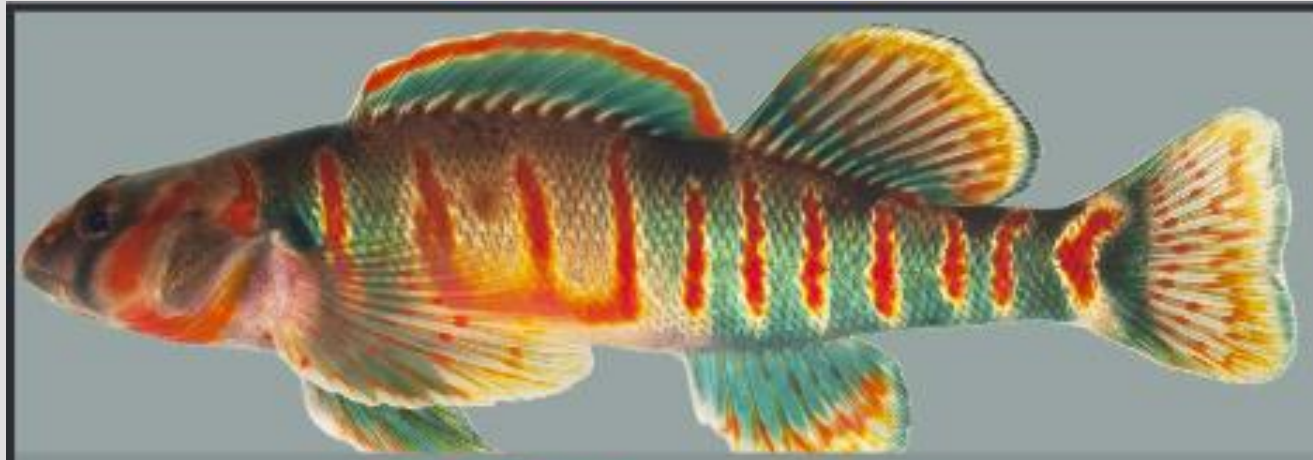
# PROPOSED LISTING - CANDY DARTER

- Proposed for Listing on October 3, 2017 as threatened.
- Comments on listing were accepted until December 4, 2017.
- Impending federal listing as threatened
- Located within the Upper Kanawha River basin
  - Bluestone, Lower New, Gauley, Greenbrier, Upper New River HUC 8 watersheds



# Hybridization

Candy darter



fertile Hybrid



Variegate darter



# CANDY DARTER (ETHEOSTOMA OSBURNI)

- Benthic fish that lives in swift, shallow riffles
- Requires coarse substrates with minimal sedimentation
- Found in moderate gradient, cool water second-order and larger streams and rivers in heavily forested watersheds
- Benthic invertivores, diet consists mainly of aquatic benthic macroinvertebrates such as mayflies and caddisflies
- Short life cycle, reaches sexual maturity in two years and typical life expectancy is three years
- Adults breed between late April and June, rear juveniles over summer and fall and overwinter with young
- Brood-hiding benthic spawner, female deposits eggs in pebble/gravel surrounded by cobble where males fertilize them
- Lay multiple clutches but a low number of eggs per clutch
- Hatch between 5-25 days depending on water temperature



# CANDY DARTER (ETHEOSTOMA OSBURNI)

- Intolerant of embeddedness of riffle substrates
- Uncommon in pool habitats
- Historical range largely reduced due to habitat degradation
- Often found in trout-stocked cool/cold water streams where they are subject to predation
- Hybridization with variegate darter is dominant threat to continued existence
- Variegate darters introduced above Kanawha Falls purportedly by bait bucket introduction, first discovered in 1980's
- Variegate darter utilizes similar habitat as candy darter
- Mating produces fertile offspring which, due to a few short generations dilute candy darter genes out of the population leaving only variegate darters
- Hybridization in Greenbrier and lower Gauley
- Dams prevent spread of variegate into Upper Gauley and middle/upper sections of the New
- Preventing transfer is vital to continued existence of candy darter





# WHAT APPLICATIONS NEED TO DO ESA CONSULTATION?

- New Permits
- Amendments
- Not Started Renewals
- Significant Permit Revisions
- IBR's if WVDNR Lands inquiry is checked for rare, threatened or endangered. Check with HQ staff biologist





# WHAT SHOULD BE IN THE PERMIT?

- Filled out MR-27 Form in H-4
- Proposal/Drainage Map in Maps Section
- WVDNR Lands Inquiry Response in H-2
  - Everything mentioned within the WVDNR Lands Inquiry should be discussed within Section H-5 of the Permit.



# WHAT SHOULD BE IN THE PERMIT?

- Surveys reports or Survey Summary Sheets (If survey completed) in H-4
- Protection and Enhancement Plans (PEPs) (If completed) in H-4
- Initial response from HQ in H-4
- Closure letter from HQ in H-4
- Everything mentioned above should be within the permit for the record.



# QUESTIONS?

