

00:16
learn to read it wouldn't you might be
00:19
able to tell I have a speech impediment
00:22
because I have this hint that um this I
00:25
want to call it a handicap but because I
00:26
have that impediment
00:27
they got me motivated by giving me books
00:32
animals such as frogs to read and get
00:34
into the academic world so he was only
00:39
animal he was always drugged and when we
00:41
think of frogs in general we think of
00:44
this kind of blobby in Fibby just this
00:47
mushy blob of long leg up stir around
00:52
and has this complex lifestyle so let's
00:56
focus on those two things first the the
00:58
body of the animal and the lifecycle of
01:00
the animal the life cycle we've has been
01:04
drilled into our heads since we were in
01:06
kindergarten so we've got frogs they
01:08
come together the mail climbs on top
01:10
heap deposited sperm into the water
01:11
while the female deposits the eggs into
01:13
the water so we've got external
01:14
fertilization no eggshells you and the

01:17
female scoots out her eggs which come
01:19
out of the fog about the size of a golf
01:21
ball once it hits the water it expands
01:25
kind of like tapioca so on the bottom of
01:27
this image here we have a older egg mass
01:30
and right behind the females legs we can
01:32
see the new egg mass coming in so we
01:34
start off frog life as an egg in a mass
01:37
of hundreds of eggs those hatch out into
01:40
tadpoles
01:41
the tadpoles have these long tails they
01:44
don't have any legs they've got these
01:46
big beady eyes they have gills and those
01:49
will then undergo metamorphosis where
01:51
they will grow their legs generally the
01:53
back legs first then the front legs will
01:55
appear and they'll suck up that tail and
01:57
become what's known as a frog let and
01:59
that is the cutest piece of jargon that
02:02
you're going to hear today frog let is
02:04
the scientific term for a newly
02:06
metamorph drug so this froglet has a
02:08
tail stub but besides that he's got

02:10
everything he needs to be an adult
02:12
Pharaoh
02:14
lungs but there's a lot going on here
02:16
that we haven't learned about in middle
02:19
school so let's go go back to the adult
02:25
fare exam on the left adult frog some
02:27
meat eaters the carnivores they hop
02:29
around the forest eating insects if it
02:32
moves it's probably and it's smaller
02:34
than you then its food if it moves in
02:35
it's bigger than you it's probably a
02:37
dreaded o so it doesn't really take much
02:39
to be a frog those are your two big
02:41
thoughts as
02:44
eight Aryan so they're eating mostly
02:46
algae in the pool
02:48
they'll be chewing on dead leaves that
02:50
have algae to go
02:52
when on them we'll be eating bacteria
02:55
and fungus every now and then they'll
02:57
eat some plankton every now and then
02:58
they'll eat a dead colleague but for the
03:01
most part though vegetarians so if we

03:03
look at the guts of these and fit these
03:05
are tadpoles and oh kinda see through we
03:07
can see these big spirals so they had
03:10
these massive intestines to be able to
03:12
break down all of that woody material
03:15
all of that vegetation and use that grow
03:19
once they start to get him off and they
03:22
gain the legs and all absorbing their
03:25
tail they stop eating and then as a
03:28
froglet go back to the the like the
03:31
adults fall to the life cycle where they
03:33
are eating insects and little things
03:35
that move around so the digestive system
03:38
here this has this major overhaul going
03:41
on during metamorphosis it's a very
03:43
stressful time and to be a frog because
03:48
we're going from a vegetate a vegetarian
03:51
to a carnivore we need to redesign the
03:54
entire digestive system we need to take
03:56
out that huge gut similar to a cow gut
03:59
or a horse gut with a really breaking
04:01
down on that vegetation and we need to
04:03
make it into something that's more like

04:04
a cat gut well it's a short intestine
04:07
and the it's much easier to digest
04:10
protein so we don't need to have as much
04:12
space within the body as much energy the
04:16
maintaining that digestive system so
04:19
since we're breaking down our digestive
04:21
system and going from a horse digestive
04:22
system to a cat digestive system they
04:24
need to just have this purely in the
04:26
middle where the digestive system is
04:29
turned off and that's the metamorphosis
04:31
right there in the middle where they're
04:32
not eating instead they still need to
04:34
get energy somewhere so the literally
04:37
digesting the tail to be able to have
04:39
the energy to continue to function while
04:42
this change is happening and there's
04:44
another thing going on
04:46
here that's very important that we don't
04:49
see and that's the immune system as a
04:51
frog you have a frog immune system as a
04:53
tadpole you have a tadpole immune system
04:55
when you're a metamorph you're both frog

04:58
and tadpole at the same time so we need
05:01
to turn off the immune system otherwise
05:03
those tadpole immune system because you
05:09
know what's the cell doing here it's a
05:10
frog cell I'm not a frog I'm a dad Paul
05:12
and at the same time any he any cells
05:18
from the adult immune system are going
05:20
to be going after the tadpole cells so
05:23
they because the change is so dramatic
05:27
they actually have to turn off the
05:29
immune system this means that doing
05:31
metamorphosis frogs are incredibly
05:34
susceptible to disease this is the time
05:36
where we see mass die-offs when a
05:39
disease goes through a population I've
05:41
had times probably about a dozen times
05:43
in the past ten years where I've walked
05:45
out to a vernal pool of another wetland
05:47
in one day it's completely fine tab
05:50
holes are swimming around everything's
05:52
good and then two days later I go and
05:54
have all the tadpoles a floating belly
05:57
up covered in fungus starting to decay

06:00
and I'm within a couple of days those
06:02
bodies are gone and all you see is a
06:04
pool that has no tadpoles in it and
06:06
what's happened there is that as the
06:08
tadpoles reach metamorphosis and turned
06:11
off the immune system Ronna virus
06:13
native and relatively common violence
06:17
has gone through and wiped them out
06:19
during this period now that doesn't
06:21
necessarily mean that that population is
06:23
not going to recover it just means that
06:25
that particular year
06:27
there's not going to be any juveniles
06:30
reduced to eight add to the population
06:34
so here we have the skeleton of an adult
06:38
frog so let's take away all the flesh
06:41
and look at what a frog is based off of
06:43
these bones here if we look at legs will
06:47
see that the villi who elongated coming
06:51
from the hips out we've got the femur
06:53
and then we would have a tibia and a
06:56
fibula for our lower leg the thigh look
06:58
has a fused bone fused long bone there

07:02
and then where we would have our tussles
07:04
the the main part of our foot there
07:08
they've only got the two bones together
07:10
and those are combinations of the future
07:12
cells and then they've got really long
07:14
toes sticking out so everything about
07:16
this hind leg is E
07:20
they can push off the ground so as long
07:23
as possible if you're a frog in your
07:26
main defense is
07:29
going to be getting away from the
07:31
predator before it can pick you up you
07:33
want to be pretty quick at doing it so
07:34
if you're swimming in the water you want
07:36
to push a lot of water at once and if
07:37
you are hopping across the ground you
07:40
want to hop as far as you can as fast as
07:43
you can away from this predator to hop
07:45
on land the longer that you are in
07:47
contact with the ground the longer you
07:50
can be pushing so long legs for the
07:53
frogs means further jumps means more
07:55
force so that they can get away from

07:57

these predators very similar to if you

07:59

think of a rabbit they've got long long

08:01

feet if you think of a kangaroo they've

08:03

got long feet long feet Oh an adaptation

08:05

for what's called saltatory locomotion

08:08

for for jumping now let's look up of the

08:11

the body of this drugs we've got well

08:13

it's pelvis is we have this fused series

08:16

of bones that are in a shape like a u

08:18

and then we've got this piece going down

08:20

the middle of them that's the euro style

08:22

which is the equivalent of our pelvis

08:24

and it it works as a long hinge so that

08:27

we can continue to extend that force the

08:30

bone in the middle is a series of fused

08:33

vertebrae so that we can have muscle

08:35

attachment to them and it makes it

08:37

pretty rigid the spine above that is

08:40

just a few vertebrae together and then

08:44

we've got the neck very short neck often

08:47

fused leading up to the skull so we

08:50

don't want a lot of movement within the

08:53

the torso of the frog we want that to be

08:56
solid it's fused together because as the
09:00
frogs jumping we don't want a lot of
09:02
bending and talk going in and damaging
09:04
those tissues the front of the frog the
09:07
the ALMS there the entirely designed for
09:11
landing so they're not pushing up with
09:14
those front legs they are just landing
09:16
on them being cushioned by them they
09:19
have the shoulder blades are not
09:21
attached to the ribcage or the spine so
09:27
that they'll more flexible and can
09:28
cushion that landing the
09:33
projection sticking out along the spine
09:35
their largest parts of the vertebrae
09:37
they're not actually ribs so frogs and
09:40
salamanders tend not to have rib cages
09:43
because they're not trying to protect
09:45
the the organs by making a shell around
09:49
them in placing them they're just trying
09:52
to get away from the predator before it
09:54
gets to that point not having those
09:56
bones there makes and them a little bit
09:58
lighter so that they were able to jump

10:00
further and then one last thing looking
10:02
at the head there we can see it's got
10:05
huge spate places for the eyes they'll
10:08
actually move their eyes when they're
10:09
eating they they can use those eyes to
10:12
help push food down their throat
10:14
they've got muscles attached from their
10:16
eyeballs to the skull that when they
10:17
shrink the eye is come in and that's
10:20
also good for swimming underwater if
10:22
you're gonna go underneath again
10:24
she might bump into it so you can pull
10:26
your guy bottles in and swim under the
10:28
water and be a little bit more
10:29
streamline you don't want to get your
10:31
eyes caught on things that could be
10:33
messy and then we've got this tiny
10:34
little Blaine case in between those
10:36
orbits the brain of a frog is kind of
10:39
looks like a piece of spaghetti the more
10:42
complex your brain is the most surface
10:44
area to volume the more ripples and
10:46
ridges and dents you have in your brain

10:48
the more space you have for cognition
10:51
and for higher functions so forth with
10:54
it spaghetti brain there's not a lot of
10:56
thoughts going on there most of what the
10:58
Frog does is literally if it moves and
11:01
it's smaller than me I'm gonna eat it if
11:04
it's bigger than me I'm gonna assume
11:05
it's a predator besides that it's
11:07
habitat selection it's looking for mates
11:09
it's listening for competitors so
11:12
relatively simple in terms of brains now
11:18
here we've got the tadpole and I can't
11:21
show you a slide of the tadpole skeleton
11:23
because they don't have them tadpoles
11:27
don't have any bones in them they have
11:29
some cartilage in the lado stages but
11:33
for the most part it's just a ball of
11:36
tissue swimming around so we've got a
11:38
very different design to this animal
11:40
we've got a boat shaped head so some of
11:43
the in shaped heads flash body and that
11:47
of a catch does one so relatively
11:49
streamlined with a big muscular tail

11:50
sticking out if we were to take the skin
11:52
off of this tadpole and look at that
11:54
tail it would look just like the side of
11:56
a fish same shape for all of the muscles
11:58
in the design there is really need to
12:00
have a big strong tail to push this
12:02
thing through the water sticking up
12:04
along the top of this animal we can see
12:06
this got a little bump that's a
12:08
spherical the tadpoles gonna be sucking
12:11
water into its mouth pushing it over and
12:13
some gills and then it scoots the water
12:15
squirts the water out through that
12:17
little spherical which allows it to you
12:19
you know it can be used for propulsion
12:21
but mostly it's just used for breathing
12:23
and besides that we've got eyes and guts
12:26
and there's not much to the tadpole it's
12:29
a eating machine they eat they poop they
12:32
hide they bask in the Sun they're kind
12:34
of like cows they spend the whole day
12:36
grazing just try I
12:37
to met him often and build up the bodies

12:41
as quickly as they can
12:42
okay so that's true
12:46
[Music]
12:47
hogs in general in Maine we have a
12:50
relatively low diversity of animals
12:52
because it's cold here and it fits don't
12:54
really like cold but we all solution it
12:55
enough to have nine different species of
12:57
frog so I'm gonna work through these
12:59
pretty quickly if you have a frog and
13:02
you pick it up and it's not slimy and
13:04
it's got lots of bumps on it and stubby
13:05
little legs you're holding an American
13:07
toad we only have one species of toad in
13:10
Maine so if you have a main toad its
13:13
American toad and *Alexis americanus* this
13:17
gene this is relatively new until a few
13:21
years ago we consider them to be *Bufo*
13:23
some people still consider them to be
13:24
Bufo I kind of just like lean back and
13:26
go fit up with the rest of the room is
13:27
saying me it's it's an American toad I
13:31
don't really need to know exactly what

13:34
the genus is it's this population it
13:37
might need to be conserved it might be
13:39
abundant and I just work on the
13:41
population level and for conservation
13:43
purposes next we have the grey tree frog
13:45
hyla versicolor truth frogs get to be
13:49
about beautiful inches they are also
13:51
bumpy but not as bumpy as the toads own
13:54
and they all have slimy
13:56
they have these big suction cups along
13:58
the ends of the fingers which kind of
13:59
make the fingers look like alien fingers
14:01
if you pick one up and you look at the
14:03
inside of its legs it's got a bright
14:05
yellow coloration that's used to startle
14:07
predators and they are I'm barely
14:11
nocturnal frog that climbs up in trees
14:14
just like the name suggests they're
14:15
generally about 20 to 30 feet up in
14:18
trees and if you have a pipe sticking
14:22
out of your house maybe a waterspout a
14:24
awning that's got a pipe along it it
14:26
might be so there's a home to one of

14:28
these guys tree frogs love tubes so if
14:32
you can put tubes up in trees PVC pipes
14:35
and they'll act as little good houses
14:38
and you can go and check out your frogs
14:39
population that way spring peepers or
14:43
the tiniest frog that we have in Maine
14:45
generally about the size of my pinky
14:46
nail though they can get up to about two
14:49
inches and they are incredibly allowed
14:53
this is one of the well the first frog
14:55
to call in the spring they generally
14:58
will breed it in places where this
15:00
in water but they'll also use seasonal
15:03
wetlands that have part of that dry up
15:07
very late in the season this little guy
15:09
is a male and he's been calling so much
15:11
that he's stretched out his vocal sack
15:14
so that dangling thing underneath his
15:16
throat there is his uninflated vocal
15:20
balloon that he uses to call females now
15:23
these guys are so loud but I actually
15:25
know a biologist who has blown out his
15:27
eardrums enough times on spring peepers

15:29
that he can no longer hear them he'll be
15:32
in a swamp with a bunch of wetland a
15:34
bunch of wetland students and they'll be
15:36
talking about all those peoples are so
15:38
loud and he just he just can't hear them
15:40
he's like you mean what if dogs
15:41
no no they mean peoples then we've got
15:45
all three green mantids
15:48
for Maine and
15:52
okay so the bullfrog the green frog in
15:55
the mink frog are all relatively large
15:57
green frogs that have they need
16:01
permanent water so we'll find them in
16:02
rivers will find them in streams will
16:04
find them in roadside ditches if they
16:05
keep water long enough they very similar
16:08
frogs in the habitat we call their
16:11
habitat requirements and in the life
16:12
history so the both frog here on the
16:14
left if we look at its back it's got
16:17
some bumps but it's relatively smooth in
16:19
terms of it doesn't have ridges look at
16:21
the green frog here in the middle and

16:23
we've got a ridge that goes from its
16:24
eyeball back along its side to its hind
16:28
legs that's its dorsolateral ridge and
16:31
that is a diagnostic characteristic if
16:34
we have a frog in hand we know it's
16:35
either the bullfrog or a green frog we
16:37
look for that Ridge
16:38
now both dogs do get big a big B all the
16:42
way up to 8 inches where there's a green
16:44
frog maxes out at about I will say 5
16:47
full inches is big for a green frog this
16:50
one here is juvenile so he's probably
16:51
about an inch long so differences in
16:54
size but you you go off of that Ridge
16:56
when you're trying to make your positive
16:58
ID the mink frogs on the right are a
17:00
little bit different they are very
17:03
similar to bullfrogs so to tell them
17:05
apart you can look at the wedding on the
17:07
hind feet there's a couple of very
17:08
nuance differences you can smell them
17:11
the name mink frog comes from a musk
17:14
that they produce that smells like a mix

17:15
musk so they are kind of a stinky frog
17:17
though most times that you pick them up
17:19
they won't actually produce that musk on
17:21
you so the best way to know is to listen
17:24
for them calling a bullfrog
17:26
sounds like a bull surprisely oh the
17:28
green frog sounds like a twanging rubber
17:31
band of a banjo so sometimes they're
17:32
called banjo frogs mink frogs sounds
17:35
like a sound like a nail being nailed
17:37
into a piece of wood the range can also
17:40
give you a little bit of a clue about
17:41
which of these three species you have in
17:44
hand because mink frogs are the most
17:46
northern frog in terms of the limit of
17:50
their southern range
17:51
so while wood frogs actually get through
17:53
the know
17:55
if the main frogs do wood frogs also get
17:57
further south so in terms of the
17:59
southern range extending frogs are the
18:01
northern estrade and that's what sets
18:02
and try analysis in those species name

18:04
means Ghana means frog except I'm tryin
18:07
Alice means the northernmost as an aside
18:09
Klamath hands means noisy a versicolor
18:12
means changing color because when the
18:14
sweet will turn white when they are
18:16
frustrated they will turn dark and
18:19
usually they're kind of great inclusive
18:20
foods referring to the X on the back of
18:22
the spring people's back
18:26
now we've got our spotted frogs in the
18:29
vn8 family the true Frog family we've
18:33
got the piccolo Frog and then we've got
18:34
the leopard frog piccolo frogs tend to
18:37
have boxes where there's leopard frogs
18:39
tend to have circles for those spots so
18:41
if you look at this piccolo frog on the
18:43
left here and we look at the spots that
18:45
are good along its back we can see that
18:47
they kind of make squeeze with right
18:50
angles some of them not all of them we
18:53
also only have two rows of spots going
18:55
down this jogs back if we look at the
18:57
leopard frog here sometimes we'll have

18:59
three rows of spots and we don't have
19:01
anything that looks squarish they all
19:04
look much more like circles they've got
19:05
a light outline to them now you can
19:08
catch the frogs that's the best way to
19:09
tell the two of these apart because a
19:11
piccolo frog on the inside of its legs
19:12
is gonna have a great orange color just
19:15
like the great reef frog does so if you
19:18
can get them in here and take a picture
19:19
of the inside of the thighs that's the
19:21
best way to identify these animals and
19:23
then our last frog is the wood frog so
19:27
we'll talk a lot about them one more
19:30
thing I want to mention though is so
19:32
we've got a toad a tree frog in a people
19:35
all peoples kind of all tree frogs
19:37
depending on how close down the the
19:40
taxonomy you look and then everyone else
19:43
the other six frogs are all in the genus
19:45
Donna this is another genus that has
19:47
recently switched names so you might see
19:50
them referred to as little babies now

19:53

Jana is a female genus and then little

19:57

Beatty is as a male term so when we use

20:00

little babies the species name will

20:03

change too so with the babies so that it

20:05

huh so bad either

20:07

that in a nirvana sabbatical so you

20:09

might see them referred to as different

20:11

names there's a lot of debate going on

20:13

right now about whether they should have

20:14

their own genus or if they should be

20:17

lumped together than the same genus as

20:19

the European frogs which were named much

20:21

earlier than them I'm personally a fan

20:24

of Rihanna it means frog with obey these

20:26

means sits on rocks and wood frogs just

20:30

don't really do that very much so I like

20:32

Rihanna so here's our

20:36

for the rest of the talk here's a wood

20:41

frog now to know that you have a wood

20:44

frog there's a couple different

20:45

characteristics that you can look at

20:46

first is that black mask wood frogs have

20:49

a dog mask sometimes it's black

20:51
sometimes it's pink
20:52
sometimes it's brown going from the nose
20:55
to the eyes to the corner of their jaw
20:58
underneath that we've got a white lip so
21:01
those two characteristics the the mask
21:04
in the white lip are the big diagnostic
21:06
characteristics to let you know that
21:07
you've got a wood frog they tend to be a
21:11
relatively smooth frog they've got a
21:12
dome a lot of ovitch the hind legs
21:14
usually have some nice stripes coming on
21:16
them and this helps them blend into the
21:18
forest floor so I like to joke that
21:22
herpetologist the the biologists that
21:24
study reptiles and amphibians we're not
21:26
very creative when we name things so
21:28
this is the wood frog the frog that
21:30
lives in the woods its species named
21:35
Slav Atticus literally means of the
21:37
forest so we've got the bullfrog it
21:40
sounds like the war the the bull we've
21:42
got the the mink frog that smells like a
21:44
mink we've got a spotted turtle surprise

21:46
it has spots we have a spotted
21:48
salamander and a blue spotted salamander
21:50
there's not a lot of creativity in
21:52
naming things but the names do tend to
21:54
give you a little hint about how to ID
21:56
the animals okay so it's not the
21:59
appearance that makes wood frogs so
22:02
special it's actually in the where they
22:05
live the habitat and what the habitat
22:07
does to the behavior that makes them a
22:10
special and phibian so here we have a
22:14
vernal pool vernal pools are wetlands
22:16
that have no permanent inland outlets
22:19
and that dry up so because of those
22:23
characteristics we can't have fish
22:25
surviving indefinitely in a vernal pool
22:28
if we introduce some bait fish into a
22:30
burner pool when the pool dries up or
22:32
when the pool dries down and it's
22:33
limited oxygen in there the fish
22:35
population is going to die off
22:37
luna pools tend to be small about the
22:38
size of a classroom some of them are

22:40
completely tiny maybe about the size of
22:42
a large bathroom and some of them can be
22:45
multiple acres but for the most part
22:47
we've got a small wetland that dry
22:49
up in the middle of the summer and then
22:51
fills back up towards the winter so that
22:55
fish can't live in them without fish in
22:58
fish of a huge predator of amphibians a
23:00
very important editor of amphibians we
23:03
have certain species that have adapted
23:06
to breed owning internal pools so if we
23:09
lose the vernal pools we lose these
23:11
species these include the blue the blue
23:14
spotted salamander the spotted
23:16
salamander unisexual salamander in the
23:19
wood frog in Maine if we go to other
23:21
states it'll can include even more
23:23
species we also hasn't have an
23:25
invertebrate the fairy shrimp will only
23:29
live in vernal pools they need the pool
23:32
to dry up and freeze in order for the
23:34
eggs to hatch so a fairly specialized
23:37
little shrimp looks like a giant sea

23:39
monkey giant brine shrimp so here's all
23:41
the no pool in April when it has plenty
23:44
of water in it this might be three feet
23:47
deep they can be up to ten feet deep
23:49
I've had plenty of burner pools that
23:50
have flooded my chest waders now we've
23:53
got that same vernal pool in July when
23:56
were down to a tiny little puddle all of
23:59
the darker leaves here and the black has
24:01
tinted leaves those tell us that this
24:04
area was flooded so dried up vernal pool
24:09
and then come the followings this will
24:11
start filling back up the water table of
24:14
my eyes and fill it up with ground water
24:15
as well in a now and winter it'll you
24:18
know it'll freeze it'll have snow on top
24:20
of it and it just looks like a little
24:22
clearing in the forest this vernal pool
24:26
you might have noticed has some black
24:27
fence around it that's a large in
24:30
phibian trap
24:32
we've got buckets buried every five
24:33
meters along the edge of the fence so

24:35
that when the animals hit the fence they
24:37
will follow along fall into one of the
24:40
buckets we'll be able to measure it
24:41
release it take pictures take DNA
24:44
samples whatever it is that all study
24:45
requires in the window we knock down the
24:48
fence and fill in the buckets because we
24:50
don't want
24:51
mammals and any other animals to get
24:54
stuck in those buckets when it's so cold
24:57
out so even though that this pool is
25:00
covered in snow and covenant ice it
25:03
still got some life going on within it
25:05
it's like a lake we're only the barely
25:07
talk wolfies most of uno pools do not
25:10
free solid it'll have maybe six inches
25:12
eight inches of ice on them and you can
25:14
drill a hole into them look down and you
25:16
will see insects and crustaceans in
25:19
little zooplankton swimming around down
25:23
there just doing what they do all winter
25:25
long plenty of light come to see that's
25:26
that ice just like when you're ice

25:28
fishing and you can see underneath so
25:31
the vernal pool lights continues through
25:33
the winter now would frogs since those
25:36
specializing in vernal pools and they
25:40
don't bleed anywhere else have to deal
25:42
with the pool drying the pool is really
25:45
a time crunch so within the the span
25:50
from April to July the wood frog has to
25:54
go through its entire reproductive
25:55
process they have to get to the pool
25:57
they have to lay their eggs the eggs
26:00
have to metamorph into froglets and all
26:02
of that has to happen before the pool
26:05
dries up we get a situation like this
26:07
here we've got a man standing in the
26:09
middle of the dry little pool and if you
26:11
look between him in the middle of the
26:13
picture you can see a dog smudge that is
26:16
thousands of little tiny tadpoles that
26:18
have dried up and turn into tadpole
26:21
jelly so this pool is not going to have
26:24
any froglets coming out this year
26:26
they're all in the pool and they've all

26:28
died but there's still an important
26:30
we're gonna have bales coming in eating
26:33
them there's gonna be plenty of insects
26:35
that go so they're still contributing to
26:37
the ecosystem and that means that it's
26:40
important not to necessarily move eggs
26:44
when you look at a pool and like oh this
26:45
is gonna dry up too soon we don't want
26:47
to move all of the eggs out of the way
26:49
because yes though those eggs might not
26:52
make it but they might be feeding
26:54
something else important like different
26:56
songbirds in the area also you don't
26:59
want to move the eggs because of those
27:00
diseases I was talking about earlier we
27:02
don't want to be spreading Lugano virus
27:04
and spreading Kichler disease and
27:06
causing population crashes and for the
27:09
year cause
27:11
and the reproductive efforts to fail
27:15
okay so in order to deal with this time
27:18
crunch big frogs have a strategy that
27:21
they share in common with the spotted

27:22
salamanders in the blue spotted
27:23
salamanders in Maine called big night
27:25
when bleeding occurs these animals want
27:28
to all be moving at once it's a mass
27:30
migration we call big night so heel on
27:34
the Left we've got a vernal pool and it
27:36
still got a lot of ice on it it's just
27:38
the edges of the vernal pool are open if
27:40
we go through the South Goodes Maryland
27:43
the entire pool will be opened by time
27:44
big night occurs but up here in Maine
27:46
well we like it cold for the frogs to
27:49
get there and to start to reproduce they
27:52
have some values in the way that we can
27:54
use to help look for them so roads doing
27:58
big night if you go out and watch
28:00
animals crushed in the Gowda you go to
28:01
your local vernal pool you will see
28:04
dozens or hundreds of vernal wood frogs
28:08
depending upon how big your population
28:11
is
28:13
is going to a cook all you have to do is
28:15
step outside at night and smell the ear

28:17
it's the first warm rain each strap
28:23
so when you step out of your apartment
28:25
for the first time and the ill kind of
28:27
smells like mud that's the microbes in
28:29
the soil waking up from the nice warm
28:31
rain you start walking around and you'll
28:34
see earthworms on your lawn that have
28:36
come up in they're starting to drown in
28:37
puddles that's the ground being thawed
28:39
so the earthworms are trying to escape
28:41
the moisture that's going into the
28:43
ground found those are two good signs
28:46
that it's warm enough for the amphibians
28:48
it's migrate and get out of the ground
28:49
and get to the vernal pools too so first
28:52
warm rain first time it's about 40
28:55
degrees and raining in the spring all
28:57
over the wood frogs will wake up and
28:58
they make this mass migration all on the
29:00
same night and move down to the vernal
29:03
pool where there will be tons of frogs
29:06
calling it's a great time to take kids
29:08
out to look for vernal pools when these

29:10
frogs are all going nuts I particularly
29:13
like to go the day after so that I'm not
29:16
getting wet from the rain if I go in the
29:18
middle of the day it's if it's nice and
29:20
sunny and warm the frogs will be calling
29:21
better yet wait until about nine o'clock
29:24
at night when the animals have had a
29:25
little bit of time to wake up because
29:27
the mostly nocturnal go to the vernal
29:29
pool when it's the day after the night
29:30
after a big night when it's not raining
29:32
take your flashlight mm-hmm you can skim
29:36
along the surface and look for the wood
29:37
frogs and you can use your light to scan
29:39
along the bottom and look for the
29:40
salamanders so hold you a light veil and
29:42
you can watch the salamanders they're
29:44
gonna dive underneath if the leaves
29:46
because they don't like the light so
29:47
then you turn your light off count to 60
29:49
they'll be back up you can shine your
29:51
light on them again take lots of
29:53
pictures and enjoy watching this

29:55
spectacle of nature that happens in all
29:57
forests okay so once the wood frogs lay
30:02
the eggs the adults don't want
30:05
staying at the vernal pool vernal pools
30:07
are just a nursery to the wood frog the
30:09
wood frog wants to spend most of its
30:11
summer in a forested wetland so this
30:14
might be an area that has a stream going
30:16
through it might be an area that has a
30:17
series of vernal pools in it it might be
30:20
an area where the ground is just moist
30:21
so if you walk into the woods and you
30:23
sit down and when you stand up your
30:25
butts what
30:26
that's a forested wetland so that is the
30:29
perfect summer habitat for the wood
30:31
frogs because this is not a species that
30:33
likes to stay near permanent water they
30:35
want to go into the woods like their
30:37
name implies hopping around eat bugs and
30:39
in order to stay moist because they
30:42
don't have those skin doesn't hold in
30:44
more hold water in very well so they dry

30:47
out very quickly so in order to stay
30:49
moist they have to find these kind of
30:51
wet places and just hang out around them
30:53
so they won't actually be in the stream
30:55
they might be like four feet away from
30:57
the stream underneath leaf litter up
31:00
along a rock where they're gonna
31:02
maintain that moisture now that's not a
31:07
good place to spend the winter because
31:09
if you are overwintering in a place
31:11
that's wet then the the moisture as it
31:15
freezes around you can damage your skin
31:19
so wood frogs migrate a second time to
31:23
the wintering habitat which is going to
31:25
be dry forests and they will overwinter
31:29
right underneath the leaves in the
31:32
mountain Maine's western mountains
31:33
they'll dig down in the soil a few
31:35
inches up to six inches and once though
31:38
there they will freeze solid
31:40
so wood frogs are very special in that
31:44
the entire bar and you can freeze solid
31:48
they turn into what feels kind of like a

31:50
frozen hamburger as the temperature
31:54
drops and their toes start to freeze a
31:56
chemical chain reaction occurs within
31:58
the body of the wood frog where all of
32:01
the water leaves the cells goes into the
32:04
space between the cells own into the
32:05
bloodstream where once it freezes and
32:08
expands it's not going to cause damage
32:09
to the cells so the wood frog literally
32:13
just freezes solid when the saw comes
32:18
and it'll go back to being frog this has
32:21
been studied a lot in the laboratory
32:22
where they'll just put the frogs in the
32:24
container and put them into a a special
32:27
freezer
32:28
and take the measurements take them out
32:31
of the squeezer watch them come back to
32:33
life take the measurements and then
32:34
there's been just a few studies that
32:35
have looked at frogs hibernating in the
32:38
wild luke's graphs were recently looked
32:42
at the hibernating frogs in western
32:44
Maine and then the picture that I have

32:46
here the forest is my colleague Tom Tom
32:50
Hastings measuring snow depth next to a
32:52
cage and within that cage there there's
32:54
a hibernating wood frog he waited till
32:56
the frog went into hibernation built
32:58
this enclosure around it so that he
33:00
could find the frog when it came out in
33:02
the string and then just left it alone
33:03
but every week went out and measured how
33:05
deep the snow was and then he's got some
33:08
hi Joe Kohn was in there to look at
33:11
humidity and temperature okay so here's
33:15
the actual cycle annual cycle of
33:17
migration for the wood frog so a very
33:20
complex life history for this animal so
33:22
the hibernating on the bottom who night
33:24
and that upland forest and then they
33:25
migrate to the vernal pool on big night
33:27
they'll spend the females are in and out
33:31
of the vernal pool they lay the eggs
33:32
load done the male's will stick around
33:33
waiting for other females for a few
33:36
weeks and then they migrate into the

33:37
upland forest the the first wetland
33:41
rather where they'll spend the summer
33:43
and then come November they'll migrate
33:45
back up to the upland forest so
33:50
on the season now there's two different
33:54
ways that we use that lifecycle use what
33:59
we know about what une affaire works to
34:00
try to protect their populations heal in
34:03
the middle of this circle we've got a
34:05
doc polygon and that is all over Nepal
34:07
so that's the nursery for these animals
34:11
the traditional way of protecting an
34:13
amphibian is this yellow circle going
34:16
around - that is just a buffer 250 feet
34:19
for the state of Maine and within that
34:21
circle there's a certain amount of
34:23
habitat that can be developed so for
34:27
this farmer if he wanted to sell his
34:29
land to a developer so so that he could
34:33
then take that money put his kid through
34:34
college he would only be able to develop
34:37
25% of that circle now the half of that
34:42
circle is not for dog habitat so 50% of

34:46
the circle that's that's kind of a
34:47
losing situation for the farmer on the
34:49
other hand that circle doesn't include
34:51
in this particular case the summer
34:54
habitat of the frogs so if we develop
34:56
everything on the outside of that circle
34:57
it's then a losing situation for the
34:59
frogs themselves so in this particular
35:03
case we've got a lose-lose for the
35:05
farmer and for the Frog now this other
35:07
shape here this yellow oblong shape
35:10
includes the breeding habitat the summer
35:15
wetland habitat and a quarter of
35:18
hibernation habitat for the Frog so we
35:21
can recall that sometimes a directional
35:23
buffer of a directional life zone and
35:25
that is a more specific case-by-case way
35:30
of conserving the frogs and in this case
35:32
that's more of a win-win the farmer can
35:34
develop more of the area he can get more
35:37
money for his land in the Frog can
35:39
complete its entire lifecycle so my
35:41
research look said that that a little

35:45
bit further so what happens when your
35:46
life when your landscape is already
35:49
partly developed when it looks like this
35:51
we've got our blue circle to the bottom
35:53
of this image representing our breeding
35:55
habitat then we've got this neighborhood
35:57
where it's relatively giant and on the
36:00
top of your screen we've got a full list
36:02
and that forest is a very wet forest so
36:05
that's good summer habitat for the frogs
36:07
so how do they survive in an area like
36:11
this lot
36:14
[Music]
36:15
research has been done on the more
36:17
natural sit areas for wood frogs so I've
36:21
been talking about the mountains trace
36:22
you Rittenhouse did a lot of work out in
36:25
the I want to say the Midwest looking at
36:28
where frogs go with using radio
36:31
telemetry to see what kind of habitat
36:33
they needed so we know a lot about what
36:35
frogs do in nature but we don't really
36:37
know much about what frogs do when

36:39
they're gonna an urban area so all these
36:41
search questions well what are the
36:42
migration patterns of these animals look
36:44
like when we've got houses in parks and
36:47
poking Lots in the way what kind of
36:50
habitat are they using are they
36:51
selecting just the more natural area or
36:54
are they using people's lawns and then
36:56
we can take those and we can try to come
36:57
up with ideas about how to make
36:59
populations persist so if somebody's
37:01
gonna develop a round of the pool what
37:03
little things can they do
37:06
big things can they do to try to make
37:08
sure that that frog population stays
37:10
there for future generations so we use
37:13
radio telemetry this study on the right
37:18
here we've got a frog who's wearing a
37:20
belt with a radio transmitter attached
37:22
to it
37:23
the transmitter works like a little
37:25
radio tower it produces a radio
37:27
frequency that we can pick up using a

37:30
radio receiver it's got a watch battery
37:32
there and then we've got a number on top
37:34
of it and the microchip and a long
37:38
antenna sticking out this is a point
37:40
three gram transmitter weighs about the
37:43
third of a weight of a penny and we use
37:45
bead cord like you would make necklace
37:49
out of for the belt to put it on the
37:51
animal so we don't have to hurt to the
37:53
Frog to be able to find out where he's
37:54
going we put the tiny little transmitter
37:56
on and then we follow it around with our
37:59
antenna and I'll receiver when we point
38:01
to the antenna in the direction of the
38:02
frog is it beeps louder so that we know
38:05
which way to go and then as well walk to
38:08
it's tougher on the BP becomes louder
38:10
again then we can adjust all receivers
38:13
make it more sensitive and we can get
38:16
within one foot of the Frog we can say
38:18
the Frog is somewhere there in this one
38:20
foot area even if the Frog is
38:22
underground and we don't see it if we do

38:24
see the flower from a distance generally
38:25
we'll just mark the area and leave
38:27
because we don't want to disturb the
38:28
animals every time that we go out to
38:30
look for them so not only do we need to
38:33
know where the animal is we know what
38:35
the habitat looks like so what
38:37
environmental characteristics are in the
38:40
area so when we find the frog or when
38:42
we're looking at aliens to compare the
38:43
fraga to we take environmental data so
38:46
things like what kind of vegetation is
38:48
in the area is it a lot of grass is it a
38:50
lot of shrubs a lot of trees is it a
38:52
golden the soil temperature how much
38:55
lawn is within in the area the Frog is
38:57
in how dense is the tree canopy cover
39:00
above it so that we can compare the
39:02
sites where the Frog uses two sites
39:03
where the Frog doesn't use availability
39:05
versus use is going to be on habitat
39:07
selection and for this study we looked
39:09
at how they were moving at both a coarse

39:12
scale where we looked at the locations
39:14
once per day and we looked at a fine
39:17
scale where we went out multiple
39:19
an I really once an hour for each frog
39:24
in order to draw more of a dotted line
39:26
and get a better idea of how the frogs
39:28
were moving through the area so that was
39:30
a nocturnal fine-scale study and we did
39:33
this at three different sites in the
39:35
Bangor area
39:36
this is the Penobscot River landing down
39:38
the middle of your screen we've got a
39:40
neighborhood vernal pool in the northern
39:42
part of Bangor
39:43
we have a park Hayden Park with Sawyer
39:47
arena in it on the Left southern side
39:50
and then there's a nursing home over in
39:52
Brewer where we were examining the
39:54
population and their movements as well
39:56
so three different study sites so that
39:58
we've got multiple conditions and that
40:00
allows us to get a better picture so
40:04
it's not just okay in this one

40:05
neighborhood the frogs are behaving like
40:06
this it's inject more in general if
40:09
we've got the multiple sites so here's
40:13
our nursing home vernal pool this big
40:16
arrow is pointing at the pool itself the
40:18
nursing home is located to the right of
40:20
that beyond that we've got a good time
40:21
at home and then we've got this
40:23
beautiful stretch of forest where we
40:26
expected the frogs were going to go over
40:28
the summer on the other side of the
40:30
vernal pool we've got a relatively quiet
40:34
road and then we've got a strip mall of
40:39
crowded
40:41
Ilia with lots of lawns and development
40:46
and relatively busy roads so we thought
40:48
the animals here were all going to head
40:50
towards the later us screen into this
40:51
beautiful forest we were able to catch
40:54
four different frogs at this vernal pool
40:57
and none of them went that way
40:59
they hung out in this scrubby little
41:01
remnant patch of forest and that was it

41:06
one of them spent most of the time near
41:08
the throne a pool and then wind up on
41:10
top of a ridge two of them the yellow
41:13
one and then the blue one headed towards
41:16
this apartment complex and there's a
41:18
little ditch grinder on the edge of the
41:19
lawn they stayed near that ditch they
41:21
stayed within about five feet of that
41:23
ditch for most of the season and then we
41:26
had our green guy here who went down
41:27
into a valley Oh patch located in
41:30
someone's backyard
41:30
so these
41:32
dogs aren't making the big migrations
41:34
that we see in the in the natural
41:36
populations the life history has been
41:39
truncated to just what's left at this
41:42
area he is the park population so we've
41:48
got the yellow line pointing at the
41:50
bleeding wetland and this is a park
41:52
that's completely surrounded by
41:53
development this area has been developed
41:56
we're using use and use that is 95 along

41:59
the left of your screen and this is
42:01
pretty much downtown Bangor with a
42:03
population of frogs surviving in it
42:06
here we've got one year's worth of frogs
42:09
this is five years from 2016 none of
42:11
them left the breeding pool we thought
42:13
that was strange but we had a lot of
42:14
mortality due to house cats in the area
42:18
and then a few mortalities that will not
42:20
show what happened in one transmitter
42:21
that died prematurely the battery just
42:23
gave out so we went out a second year
42:25
and we got a lot more frogs this time
42:28
and again most of them stayed within the
42:31
bleeding wetland some of them migrated a
42:33
little bit east and stayed within the
42:34
one Atlanta then we had one frog who
42:36
actually did venture out of the well and
42:38
he got about a hundred meters from the
42:40
edge of the swamp and then was eaten by
42:43
a flock of grackles so the home of
42:46
felix-pc species that love people I kind
42:49
of add to the mortality of these animals

42:51
as well as the house cats do and then
42:54
our final sight in the neighborhood here
42:56
we've got a cat til a vernal pool at the
43:00
end of that area we've got that nice
43:02
hosted wetland on the other side towards
43:05
on the northern part of this subdivision
43:08
in we tracked ten frogs to you in 2016
43:11
and most of them went north to that
43:15
beautiful forester wetland and then we
43:18
had a couple well that didn't quite make
43:21
it we had one the yellow one he went
43:23
south spent some time in a flooded area
43:26
of a hay field and then moved into a
43:28
Shelby Ilya the green one and the Dulko
43:31
Islands one or both mortalities one was
43:33
hit by a lawnmower and another one was
43:35
killed by a house cat so he was the he
43:39
hears me throwing some data at you we've
43:42
got our three different sites and is the
43:44
number of frogs we've got the maximum
43:45
that we were tracking each frog the
43:47
median distance the frogs moved in the
43:50
maximum distance that they wore from the

43:51
wetland with a 95% distance so if you
43:54
wanted to protect from 95% of the
43:56
population how far would you have to
43:58
protect and we can see that these
43:59
distances really Bailey in fact they're
44:02
statistically significant so we've got
44:04
two sites where migration is heavily
44:06
truncated and then one site where
44:08
migration is still occurring pretty well
44:12
but it's going through a neighborhood so
44:14
through our fine scale we wanted to know
44:16
how they were getting through the
44:17
neighborhood and these are the animals
44:18
that we track that night so we put a
44:20
little piece of reflective tape on the
44:22
antenna of the transmitter wall all gain
44:25
coats and our snow pants and went out
44:26
every night and followed these animals
44:30
through a suburban neighborhood where
44:32
all of the neighbors got to know us
44:34
pretty well because we had to knock on
44:35
every door and ask for permission hey if
44:37
the fella goes annual on three o'clock

44:38
in the morning do you mind if me and my
44:40
cronies come out with flashlights and
44:41
watch it
44:42
we'll probably be wearing black and you
44:43
won't be able to see us so we had to win
44:46
the hearts of the neighborhood to be
44:47
able to do this study but you know it
44:49
worked they liked us and they threw us
44:52
an ice-cream party at the end so here's
44:54
what we found we had a lot of frogs that
44:58
moved north into the wetland as we
45:01
expected but it took them longer
45:03
together than we thought it would it
45:05
wasn't just one night for most of the
45:07
animals though some animals didn't make
45:08
it in one night a lot of them had to
45:10
stop and spend time in a stopover area
45:14
so you'll see that a lot of these dots
45:16
are underneath bushes that's where the
45:19
frogs were hanging out for maybe a
45:21
couple of weeks before they were able to
45:24
migrate again and what they were waiting
45:26
for was vain they only moved when it was

45:29
a downpour and relatively warm you can
45:32
see a red line that's relatively short
45:34
that frog leads to swimming pool where
45:36
there were other frogs calling and we
45:38
tried to fish him out and did not find
45:39
him so swimming
45:42
in pool of another source of mortality
45:44
for these animals there's a light green
45:46
one line that only has two dots in it Oh
45:49
each dot here is where we actually found
45:50
the Frog and then the lines connecting
45:52
them are just hypothetical tasks that
45:54
frog the green light green frog went
45:56
into a garden and hung out underneath a
45:59
lubob plant for a couple of days and
46:01
then his dog
46:02
slipped off and we don't know where he
46:04
went light green frog travels through
46:07
the neighborhood and found a different
46:08
wetland the öhlins frog we didn't find
46:10
actually at the pool we found her when
46:12
we were walking back and forth to the
46:13
call from the pool and we followed her

46:15
list he bounced around house to house in
46:17
her and the light blue frog both spent a
46:20
lot of time just hanging out in the
46:22
grass the light blue frog he was in the
46:25
dash for a couple of weeks and that
46:26
landowner was getting a patient he
46:27
wanted to mow the lawn and eventually we
46:29
told them okay just go ahead if you
46:31
killed the Frog it's it's you know it's
46:33
data it's your lawn go ahead and the
46:35
Frog survived being mowed because he was
46:37
so far in the grass that he did not
46:39
reach the lane
46:43
um see so yeah so the takeaways here
46:48
that we see is that they they don't
46:49
really like hanging out in the lawns but
46:51
they are capable of doing it but mostly
46:55
if they need to stop moving those bushes
46:58
and rhubarb plants and brush piles are
47:01
really important for these animals so if
47:04
you want to help frogs move through your
47:06
neighborhood all you have to do is plant
47:07
a garden and put a bush out and that's

47:09
gonna be really important for those
47:11
frogs to survive during dry spells in
47:14
the migration okay so some conclusions
47:16
from the study first that they're
47:18
looking for forests rather than lawns so
47:21
the animals aren't going out to the
47:23
middle of the park they're not spending
47:25
the summer in the middle of people's
47:26
lawns you're going through lawns but
47:28
they're trying to find a forest we've
47:30
got belly migration distances so some
47:33
areas the frogs just don't migrate they
47:35
stayed in the in the vernal pool because
47:37
there's no other force throughout land
47:39
for them and that they can cross lawns
47:42
but they if they get stopped by either
47:45
morning coming or by the vein letting up
47:47
having that diurnal reference in the
47:49
form of a shrub can really help them
47:51
okay so we're gonna wrap up now so the
47:55
biggest threats to frogs in general then
47:57
I want to draw your attention to you or
47:58
habitat loss and degradation like a lot

48:01
of other species once we lose the
48:02
habitat you can't have a frog so a
48:04
vernal pools we don't have wood frogs
48:06
climate change is gonna be particularly
48:08
important for wood frogs because as the
48:11
climate warms we get more cold spells
48:14
and warm spell some less snow cover if
48:17
your arms are going to go through more
48:18
freeze thaw cycles and there's only so
48:20
many times you can freeze solid and thaw
48:22
again before there's damage to your
48:24
systems spread a disease are gonna buy
48:27
less and catch you by this pollution in
48:30
terms particularly of lawn chemicals and
48:33
agricultural chemicals Oh a big deal to
48:36
the frogs because they're just gonna
48:37
suck these chemicals wading through
48:39
those skin over the exploitation this
48:41
can include who go to kill but usually
48:43
it means harvesting animals so if we
48:47
haul this to too many frogs and you know
48:49
bullfrogs and pig frogs are a big on
48:51
this over-exploitation can cause

48:54
population declines and then finally
48:56
they subspecies open the forms of
48:58
invasive plants coming in and changing
49:00
the habitat and in competitive frogs
49:02
coming in can cause declines of frog
49:05
populations so what can you do to help
49:08
first off educate you appeals the more
49:10
people know about in fibian's the more
49:12
that they can the more that they're
49:13
gonna care about them in the more they
49:15
care about them the more likely they are
49:16
to help in the conservation if you want
49:19
to avoid lawn chemicals yourself
49:21
pesticides do really bad things to frogs
49:24
window trying to migrate through or if
49:26
they run off into the breeding sites
49:27
leave some shelter trees if you if you
49:30
are in the forestry those shelter trees
49:32
or just shrubs and bushes in your
49:36
neighborhood have been a help with those
49:38
those animals during migration and help
49:41
them stay moist
49:42
you can't skill a lot of frogs during

49:44
migration so keep your kitties inside
49:46
support environmental organizations that
49:49
are particularly those that are trying
49:50
to conserve habitat and the most
49:52
important thing you can do to help drugs
49:53
is get out there and vote so that we
49:55
have people who understand the need for
49:58
wildlife and for the environment for
50:02
humans because we're not just out there
50:04
trying to keep pesticides out of vernal
50:06
pools to help drugs we want our children
50:08
to not have to deal with these chemicals
50:11
as well a couple of resources for you
50:13
there's a really good main and phibian
50:16
reptile book out this is available
50:18
wherever books are sold and on amazon by
50:20
mack hunter around calhoun and malcolm
50:22
mccullough some wonderful illustrations
50:24
in a CD so you can learn the calls all
50:27
web page the of pools and people web
50:30
pages vernal pools done m/e this has
50:33
information a lot of videos about how to
50:35
identify different egg masses and find

50:37
the animals we also are starting a
50:39
outreach part of it so there's a comic
50:42
strip following the life cycle of
50:44
salamanders on there and a brand new
50:46
coloring book that you can print out and
50:48
hand out to children also laying elliott
50:54
has a fabulous web page so that you can
50:56
learn the calls of the frogs and toads
50:59
so that you can identify what's calling
51:01
from your backyard okay
51:03
and I with that I'll leave the names up
51:07
in
51:10
few minutes left so I think it's fine
51:12
up friends okay thank you so much
51:15
Chris that was fascinating
51:17
very passionate and great work this is
51:22
going to be a fabulous resource to
51:24
educate others that we'll put on our our
51:26
website so a few questions and if people
51:28
need to get off as we do it going
51:31
through this feel feel don't feel
51:33
obligated to stay on because of the time
51:36
but it's this is really wonderful

51:39
information so one of the questions we
51:43
got from Beth Nissen is she says thank
51:46
you for this wonderful and informative
51:47
presentation Chris can you speak a bit
51:49
about how a changing climate conditions
51:52
would alter these life cycle patterns of
51:54
Maine's amphibian species I know you
51:56
briefly mentioned it but is there
51:58
anything else that you like too broad
52:01
yes so what amphibian is being so
52:04
susceptible to drying out because the
52:07
skin is so permeable a climate change
52:11
can do a real wallop on these animals
52:13
particularly compared to mammals and to
52:15
reptiles which are better at conserving
52:17
water so first off the DRA I you it is
52:21
the dry oh those forested wetlands are
52:23
going to be and the less quality habitat
52:27
they're going to be for these in fib
52:28
Ian's also if you look at the reading
52:32
cycle for frogs in general where they
52:34
need those those wetlands to to breathe
52:37
in for their tadpole States if the if

52:40
the climate it changes its gonna affect
52:43
those wetlands so let's take a scenario
52:45
where we're not we don't have as much
52:48
snow cover because it's warmer and we're
52:51
getting more gain or the snow is thawing
52:53
earlier now we don't have as much for
52:55
gone off in the springtime to fill up
52:56
those vernal pools all at once so if we
52:59
have a vernal pool that's not connected
53:01
to groundwater that pool might not have
53:03
water in it anymore and that population
53:05
might just die out if we do have
53:08
groundwater the ground water might surge
53:10
and then recede too early for these
53:14
animals so if we're not replenishing the
53:16
groundwater we might have a shorter
53:18
hydro period for the vernal pool also if
53:21
we don't
53:23
have such a good big night big night is
53:27
very dependent on having cold veins and
53:30
then a warm vein to wake everything up
53:32
and to coordinate everyone if we have a
53:34
bunch of little trickle nights instead

53:36
of big nights the animals are going to
53:37
be more straight out when they get there
53:39
they might not have as good success at
53:42
finding a mate and then if the pool does
53:45
dry up sooner all of the tadpoles are
53:47
going to die so on top of the
53:48
hibernation we've got every stage of the
53:51
life cycle for these for these Vivien's
53:54
it really depends on the climate and
53:56
it's very and they are specific to the
53:59
local area so if we take a frog from
54:02
Ohio and bring it up to Maine it's not
54:04
going to be adapted to all climate it's
54:06
gonna be adapted to Ohio's climate and
54:07
it's not gonna like you know the Maine
54:09
frogs need Maine's climate and as
54:11
climate change we might see those
54:14
populations decline one other thing is
54:18
disease is very closely linked to
54:20
climate change you might have heard of
54:21
the mass die-offs in Central America and
54:25
Australia due to kitchen by this one of
54:27
the primary causes of those mass

54:29
die-offs was climate change so warmer
54:32
areas means that Z's is has a higher
54:36
metabolism and can infect more animals
54:39
so yeah climate change is bad news for
54:41
frogs great answer that's really really
54:45
interesting so David Oaks says thank you
54:49
let your enthusiasm and the work that
54:51
you are doing what is the overall health
54:53
of the wood frog population in Maine and
54:56
Beyond in Maine the wood frogs are
55:00
currently doing feel they well if we go
55:04
through the south towards southern
55:05
limits of the range we are seeing large
55:08
declines of them there are areas you
55:11
know I mentioned Ohio homage Ohio again
55:13
there were areas and Ohio where there
55:16
used to be lots of you know relatively
55:18
common wood frogs large populations
55:20
where they're entirely gone and we think
55:24
that that's a climate change thing it's
55:26
also a habitat loss in a chemical thing
55:29
so what drugs in general there are areas
55:33
where they're doing okay and there are

55:35
areas whether or not
55:37
okay generally the less people you have
55:39
the healthier population of wood frogs
55:41
you have one more thing that contributes
55:43
to that is connectivity of vernal pools
55:46
so if we have a little pool that dries
55:48
up too early most years then has a wet
55:52
season we're gonna get a bump a cup of
55:54
wood frogs coming out of that of
55:55
Scarlets coming out of that pool if
55:58
we've got another pool nearby that every
56:00
year has a good number of Records coming
56:03
out and then those populations are going
56:05
to have some crossover some gene flow
56:07
between them that are gonna link the
56:09
populations keep them healthy keep them
56:11
from inbreeding and if that that first
56:14
pool does have many years in a row where
56:18
it doesn't produce any frogs that
56:20
population might temporarily go extinct
56:23
and might be colonized by the other pool
56:25
so having connectivity between pools is
56:28
very important for the long run and the

56:30
more that we have organization and more
56:33
straw development which is a huge factor
56:36
in southern Maine and in southern New
56:38
England the less connected these these
56:41
populations also the less likely to
56:43
recover so so right now we're looking
56:46
okay in Maine but it's it's not the
56:49
piaced of outlook for frogs in general
56:51
it was recently a study by USGS I want
56:54
to say it came out in the past five
56:56
years where they found that frogs in
56:58
general every species of frog all over
57:00
the United States is declining by a rate
57:02
of 3 percent per year so if we expand
57:07
that 3 percent this year and 3 percent
57:09
the next year it's like interest where
57:11
it's gonna be that the decline is gonna
57:13
be growing swifter and Swifter and if we
57:15
don't do something about this
57:16
all great-grandchildren might not have
57:19
frogs anymore
57:20
so so froggy doomed a sorry for the
57:23
download go out and vote and stop using

57:26

lawn chemicals keep your pets inside

57:27

there you go so another question is from

57:32

surah Jason she says great info Thanks

57:34

do the viruses you mentioned also affect

57:37

peepers and if a vernal pool that has

57:40

had lots of frog sounds for years

57:42

suddenly goes quiet is the virus the

57:45

most likely cause

57:49

the violence usually affects the

57:52

tadpoles men morphing the adults can be

57:55

careful use of the vilest and they can

57:57

be infected by the virus but it usually

57:59

doesn't hurt them that badly so that the

58:02

way that the viola survives we used to

58:03

use is by infecting adults the adults

58:05

don't actually get sick they just kill

58:07

either by this and then when they go

58:09

back to the pool they reintroduce it

58:12

into the pool and infect their offspring

58:14

pretty much so that they act as carriers

58:17

so in that situation we would expect

58:20

that the the tadpoles would be more

58:22

affected and maybe overusing use of

58:24
repetitive die offs we would see a
58:26
decline in the adult peepers in silence
58:28
and the pool itself but I don't think
58:30
that's what's going on here I have heard
58:32
from people all over the state this year
58:34
who have how always had people is
58:36
calling from the vernal pool their
58:40
permanent pond and then this year it's
58:42
been quiet so I think there's some other
58:44
thing going on there's some other
58:46
culprit here that's causing a decline in
58:48
people's in certain areas in this would
58:53
be a great thing to study too if you
58:54
know if there's any future grad students
58:56
out there listening that need a project
58:58
mapping these occurrences and trying to
59:00
figure out what's going on with these
59:02
sudden declines because if I've hood it
59:04
both for peoples and for American toads
59:07
that people have always had American
59:09
toads and suddenly them gone it might be
59:12
the bio so that I think there's
59:14
something else going on here so I have a

59:16
question for you are there other are
59:20
there studies that are going on with
59:22
amphibians in Maine that our volunteer
59:25
observers might be able to volunteer to
59:29
be participants in oh yeah so right now
59:36
we have a study going on in northern
59:42
Maine and in Downey East areas where
59:44
there's a like my colleague my office
59:47
mate Scott Linden man is accepting
59:49
volunteers to go out and look for
59:51
different species of amphibians and
59:53
reptiles they're focusing on the main
59:57
and phibian and reptile atlas so this is
59:59
an atlas that shows where the different
60:02
species
60:02
the geographic range within the state
60:04
it's based on quadrants where they'll go
60:06
out to different counties and someone
60:08
will find the animal and report it and
60:10
then we know where the animals occur and
60:13
this is becoming increasingly important
60:15
with of course climate change because if
60:17
the dangers of these animals shift if

60:19
they start moving further north or they
60:21
start declining we want to have data to
60:23
be able to compare the future to now so
60:25
Scott is taking volunteers they
60:28
generally camp but he does take people
60:31
for the day and you might volunteer for
60:35
a day and he might put you in a boat and
60:36
tell you to paddle around and look for
60:38
water snakes and snapping turtles so you
60:39
might be walking along a dirt road at
60:41
night listening for great tree frogs
60:43
calling you can find his Khan from not
60:46
his contact information but if you go to
60:48
the of tools and people webpage WWV
60:53
there's a contact button in if you hit
60:56
that you can write a little blurb in
60:59
there saying you're interested in
61:00
volunteering for him and that'll get
61:01
forwarded to him so that he can then
61:03
contact you he is particularly looking
61:06
for people this summer he has um I think
61:08
he's got a crew of about four people
61:10
going out right now and the next two

61:13
weeks the they're off after that they'll
61:15
be back to you looking for animals in
61:17
the Down East and the northern areas in
61:19
Maine there's also a few studies going
61:23
out of colleges in the southern part of
61:27
Maine in York County so if you would
61:30
like to get involved of an afib Ian
61:33
study you can google your local college
61:36
and find the biology department send
61:39
them an email and ask if there's anybody
61:40
who's accepting volunteers great well
61:44
that's great well this has been really
61:46
wonderful Chris and I can't thank you
61:48
enough
61:48
and with that we'll thank everyone for
61:51
participating and this will be up on our
61:54
website as a recording and you can share
61:58
it with your friends and neighbors and
62:00
other volunteers so again thank you so
62:03
much Chris it's been very very wonderful
62:06
presentation and information okay thank
62:10
you thank you all