

Lesson 3: FLOODING IS NATURAL

or *Why we don't build in floodplains*

Fill a 5 gallon bucket about $\frac{3}{4}$ full from the reservoir of the stream trailer.

Use the screed board to move about $\frac{3}{4}$ of the grit into a long “mountain” along one side of the trailer. Create a large, very flat bed of grit about $\frac{1}{2}$ inch deep in the center of the trailer. Pile excess grit on the other side of the trailer in a small mountain. Leave the space around drain clear. Set front-to-back slope at 3 turns above level using the hitch jack.

Use large scoop to excavate a simple arc-shaped channel stretching from the inlet to the drain. Make a steep-sloped mountain on one side of the creek and a flat floodplain on the other.

Use large flat rocks to armor the larger mountain adjacent to the water inlet. Shape the small mountain so that flood waters will have nowhere to go but onto the floodplain.



The flat area along side a creek or river is called “flood plain.”

Building on the flood plain is not a good idea.

“You’ve probably noticed that some areas along creeks and rivers are flat. It’s the natural flooding of the creek or river that forms these flat areas over many thousands of years.” Most creeks or rivers come out of their banks every few years. This happens more often in cities than in the country (why?) The floodplain is the part of the creek or river that carries the extra water in during floods.

Answer: Pavement in the cities and suburbs cause more runoff and frequent floods.

Start moderate flow to establish natural channel

Increase flow for 5 to 10 seconds to see if you can inundate the floodplain. You may try temporarily damming the flow of water from the inlet with one of the large signs and then releasing it for a mini-flood.

“ In most rain storms, the flow stays inside the channel, but when we have periods of wet weather or higher than “normal” rainfall, rises above the channel banks onto the flood plain.

Advanced lesson: *The average annual flow is the highest water level that occurs on average once every one or two years. From historical records, hydrologists can predict how often water will come out of the stream banks, onto the flood plain. Larger flows are less frequent, so the 10-year stream flow, which occurs on average once in 10 years, and the 50-year flow (or flood) occurs on average once in 50 years. The 10-year flood is larger than the average annual flow, and the 50-year flood is bigger than the 10-year flood.*

Since the 100-year flood occurs about once in a hundred years, there is a 1 percent chance that it will occur in any given year. Likewise the 10-year flood has a 10% chance, and the 50-year flood has a 2% chance. The one hundred year flood is a little larger than the 50-year flood, not twice as large.

Some people mistakenly feel safe if they are told that their house is outside of the 100-year flood plain. Because they think it cannot flood. Actually they should have less than one percent chance of flooding. Flooding can occur wherever a drain or outlet is blocked, and a small error in the maps could change everything, however.

Reduce flow to bare minimum.

“Floodplains are part of the river – they help reduce downstream damage by letting the water spread out and slow down. (What happens to the sediment in flood water in the flood plain?)”

Place houses on floodplains. Place floodplain sign.

“Why do people build houses or even whole towns in floodplains? “It’s because they think that if an area hasn’t flooded for a long time, it isn’t going to ever flood. Wrong!”

*“Why might we get increased flooding after new parking lots are built in town?”
“Why might we get flooding if there is a road crossing (or bridge) downstream?”*

Increase to high flow or dam and release water to partially flood houses.

“What do we do now? People have invested a lot building their homes and neighborhood here... Maybe the government will build a levee to prevent flooding so they can rest easy.”

Reduce flow to minimum. Use your hands to heap up a crude levee on the edge of the floodplain. Use the levee-forming tool to shape the levee by sliding it slowly along the line of the levee, simultaneously tamping to compact the grit. Place square concrete slabs on outside of levee to simulate concrete armor.

“Will it hold up to the next big flood? That depends on how much flow and where the weak spots are.”

Increase flow to maximum. Pour water from bucket until levee fails.

“Levees are not the solution. Large floods can soak in and weaken them or just overtop them. Sometimes they are breached on purpose to save other areas from flooding.”

“If the river can’t use its floodplain to hold and absorb flood water, downstream areas will get more flooding. Levees and dikes are very expensive to build and maintain.”

Show flip chart illustrations to reinforce points made in the lesson.



***Why do people build in a floodplain?
Picture from flip chart shows major flood event.***



Levees can fail or make floods worse downstream. Picture from flip chart shows failure of levees.

Conclusion:

“If you live in a floodplain already, consider buying flood insurance. In the long run we’ll all be better off if we learn not to build in floodplains. Sometimes they can be used for parks, , athletic fields and other uses that will not be damaged by flooding.”

“Where is the 100-year flood plain in your city? What does this mean? If you are not in the 100-year flood plain, are you safe from flooding? Will the flood plain change if a levee is constructed upstream from you? Downstream?” What if new parking lots and streets are constructed?