Surface Water Supplies

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Estimating Surface Water Storage Requirements in Missouri

1. Estimate daily water usage in gallons per day
2. Annual estimated water usage = Step 1 * 365
3. Annual acre-feet usage = Step 2 divided by 325,828.8
4. For two year supply – multiply step 3 by 4 (2 year supply and 50% loss)
5. Estimate watershed area – multiply step 4 by 2.4 to get watershed area to refill pond in one average year

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Ponds – Planning, Design and Construction

NRCS - Agriculture Handbook 590

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Preliminary Investigations

- General Considerations
- Area adequacy of the drainage
- Minimum pond depth
- Drainage area protection
- Pond capacity estimation
- Landscape evaluation

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Figure 11 A guide for estimating the approximate size of a drainage area (in acres) required for each acre-foot of storage in an embankment or excavated pond

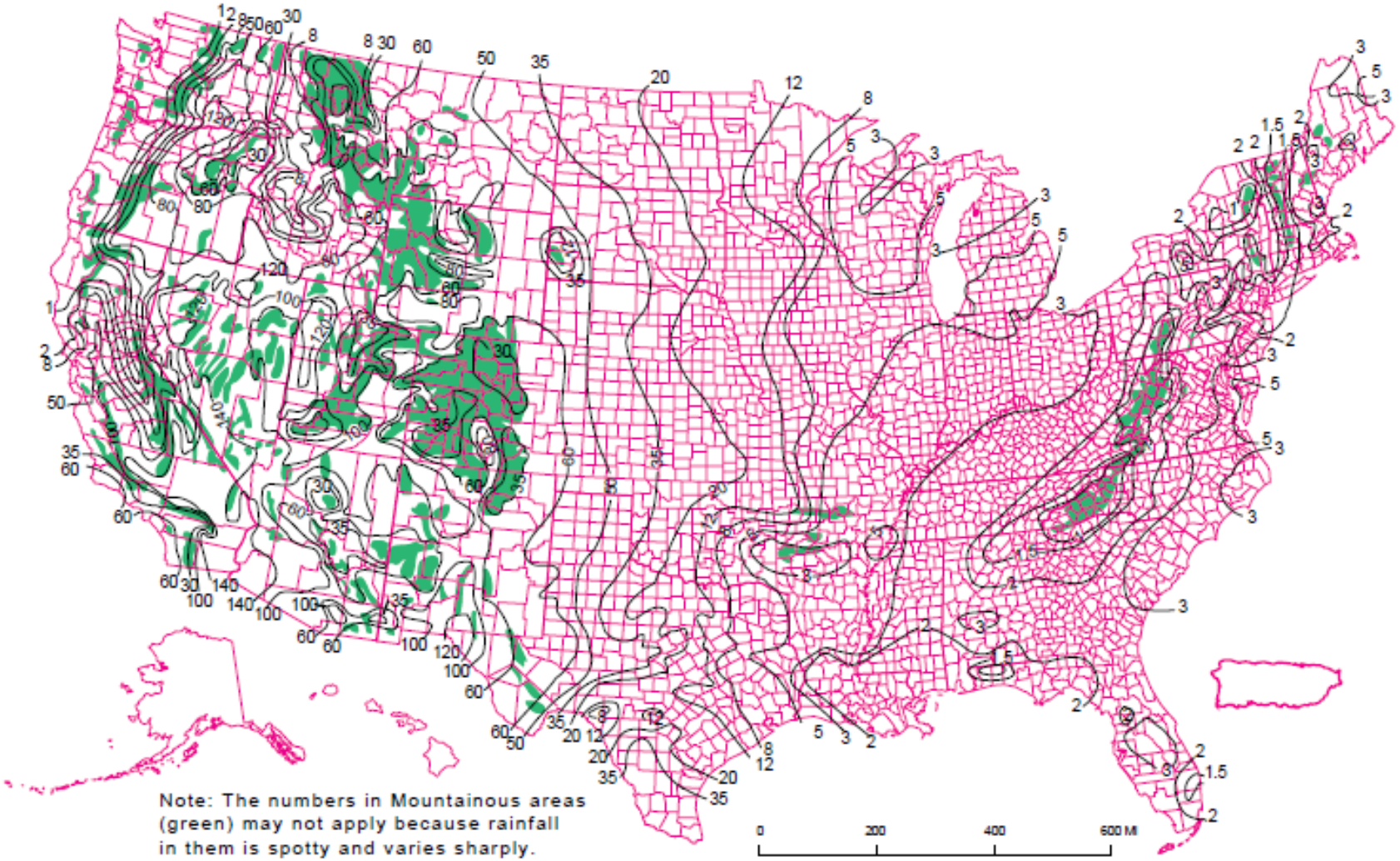

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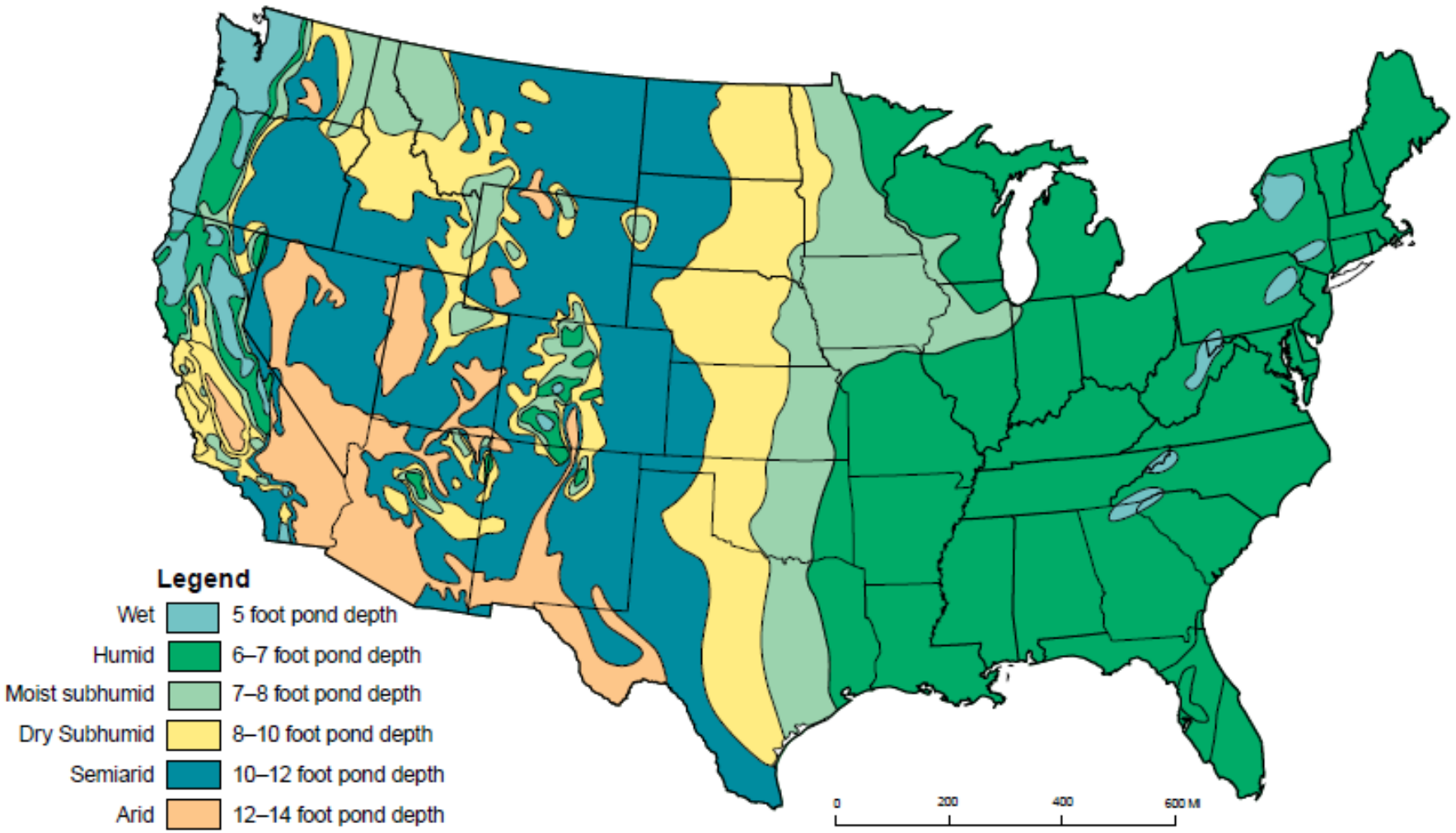
Figure 12 Recommended minimum depth of water for ponds in the United States



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Estimating Pond Capacity (p. 12)

1. Establish normal full pond water elevation
2. Measure/calculate full pond surface area
3. Volume estimated by multiplying surface area times 0.4 times maximum water depth measured at the dam

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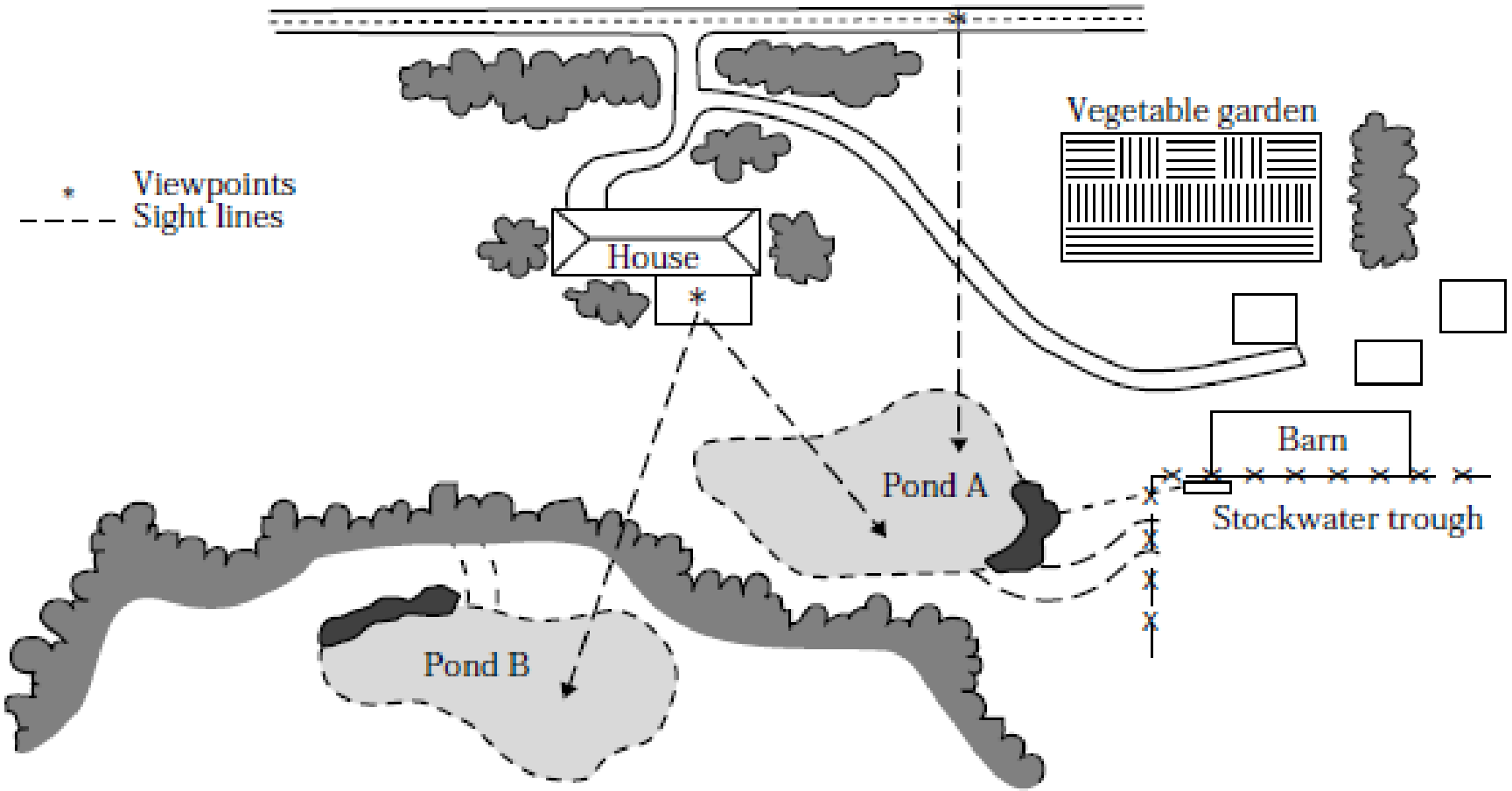
Figure 14 A preliminary study of two alternative sites for a pond to be used for livestock water



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Stream and River Surface Water Harvesting Issues

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Issues – Army Corps of Engineers

- Corp does not regulate temporary structures such as a floating intake.
- A permit is not needed if there is no construction in the channel and as long as no spoil or dredge material goes into the channel.
- If bank is altered, soil must be brought back and place on the land or hauled off. Also disturbed area must be protected from erosion so that silt does not enter the channel.

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Issues - MDNR

- One has the riparian right to use water from the river as long as it does not adversely affect the water use of other individual water users. This is true as long as one owns the land along the stream or river where the water would be pumped.
- If the pumping rate is 70 gallons per minute or greater, the Major Water User Law requires registration with the Department of Natural Resources and an annual water usage report filed with the Department.

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Other Issues

- Ensuring that one has ownership of the land where the pumping site would be located.
- Making an estimate of the volume of water that would be pumped from the river each year.
- Consider pumping water when the river flow was such that a floating intake could be used so that no channel modifications would be needed. A floating intake would eliminate the need for a Permit from the Corp of Engineers because of channel modifications.
- Pumping when the flow in the river is above low flow should keep from having any adverse affect on any other water use.

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