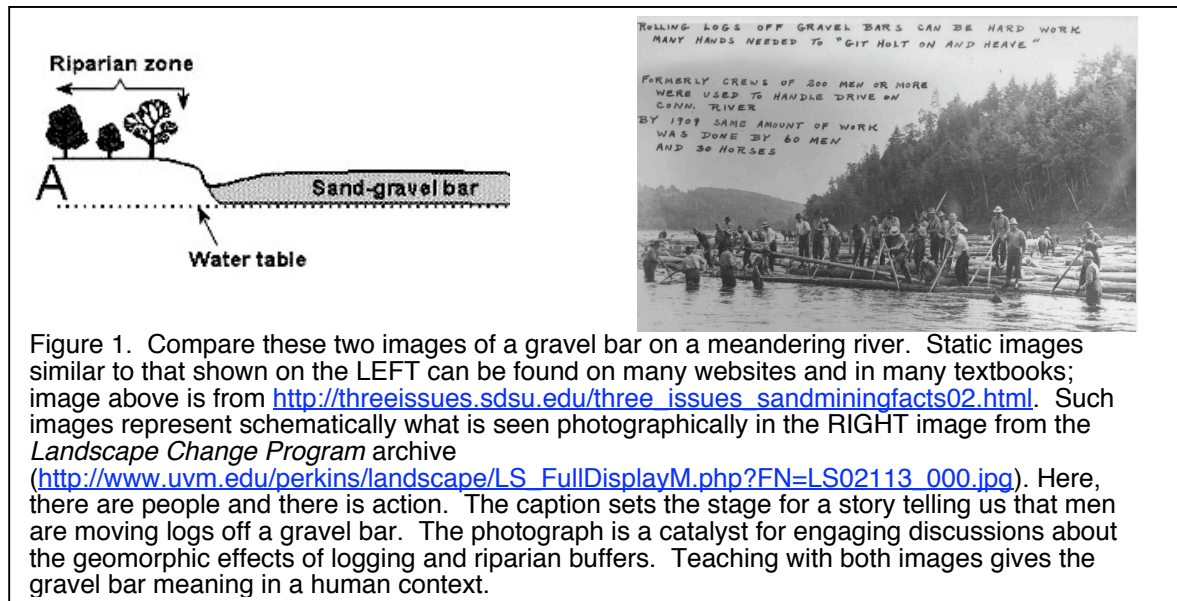# Do learners see what we think they see?

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As teachers, we use images to convey all sorts of information. Some times, images are used to convey abstract concepts or tell stories; other times, images are used to represent far away places that we can't easily visit or processes that can't easily be visualized directly (Figure 1). At the University of Vermont, we are using predominately photographic images to step back in time and teach students about human/landscape interaction—our work is tied to the *Landscape Change Program,* which we consider to be a virtual time machine; its 10,000+ images are freely accessible on the web at www.uvm.edu/perkins/landscape.

Figure 1. Compare these two images of a gravel bar on a meandering river. Static images similar to that shown on the LEFT can be found on many websites and in many textbooks; image above is from http://threeissues.sdsu.edu/three_issues_sandminingfacts02.html. Such images represent schematically what is seen photographically in the RIGHT image from the *Landscape Change Program* archive (http://www.uvm.edu/perkins/landscape/LS_FullDisplayM.php?FN=LS02113_000.jpg). Here, there are people and there is action. The caption sets the stage for a story telling us that men are moving logs off a gravel bar. The photograph is a catalyst for engaging discussions about the geomorphic effects of logging and riparian buffers. Teaching with both images gives the gravel bar meaning in a human context.

We are not alone in considering the power of the photograph to tell stories and influence thinking. Images show how natural forces alter human lives and societies, be it landslides destroying California homes or the devastating power of tsunamis washing over entire nations. With the Internet, images are transmitted immediately to people around the world. Not only has informal science education become image and data-rich but formal science training now depends heavily on imagery and computer-aided visualization. The trend is not surprising; images can code, display and preserve information far more densely that words. Indeed, advertising has harnessed the power of images for years (Figure 2).

Now Only You Can Save Grand Canyon From Being Flooded…For Profit

Figure 2. Images matter! Here is the photograph (right) that lost David Brower and the Sierra Club their tax-exempt status for "lobbying" to save the Grand Canyon from flooding. Image (altered by BLM in 1949) shows proposed location of Bridge Canyon dam and associated reservoir. The headline above topped the full-page *New York Times* advertisement in which the image appeared on 6/9/1966.

We have just received NSF support (Educational Materials Development) to pilot web and classroom-based educational materials founded on the yet-to-be-formally-tested hypothesis that photographic images of landscapes are a more effective catalyst for student engagement and learning than traditional diagrammatic approaches. In other words, does the interest we see anecdotally in the classroom when we use such photographs, actually translate into sustained student attention, better learning outcomes, and more favorable impression of the learning environment as a whole? So far so good, but, how do we know what students really see in the images we show them?

Our work over the next few months, and one of our interests in attending this workshop, is to figure out how we will know better what students actually see when looking at an image. Unless we understand how the body of learners we seek to serve actually sees and interprets images, we won't be able to design meaningful educational activities or even properly design evaluation exercises to see if the activities we create are working. Our immediate goal is thus to understand better the spectrum of ways in which students see and interpret images documenting the interaction of people and the natural landscape.