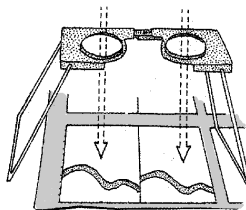


# Discoveries

News & views from Discovery Southeast

Summer 2000



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## Bird's eyes for the landbound

Richard Carstensen

Regular readers of *Discoveries* may recall that we've begun to print 'double-image' air photos of Southeast Alaskan landscapes. Stereograms are paired pictures taken from slightly different angles, in order to be seen in 3D. Air photos show features we never see from our landbound perspective. Viewed in 3D, they give vantages unavailable even to birds. The handheld 3D viewer attached to this newsletter should allow you to see stereograms more easily and in more detail than by 'freeviewing,' described in past issues. This is a one-time mailing, so please save the viewer; future issues will feature more favorite Southeast locations in 3D.

**Eagle River** This stereogram of Herbert-Eagle estuary is a great example of how much you can learn from aeriels. Texture of forest canopy suggests a history of blowdown. Trees on the flats reveal variations in soil drainage, and response to glacial rebound. Snaky curves of existing and abandoned streams and rivers show a fast evolving system typical of glacial outwash. Effects of gravel extraction at the Herbert/Eagle confluence can be examined. And by

*continued on page 3*

North-left stereogram of 1) Scout and 2) Methodist camps at Eagle River. Overlaid numbers on left image are discussed in text

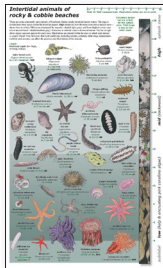


## Discovery News

Jono McKinney

### Discovery Pocket Guides

Imagine having a Discovery Southeast naturalist like Kathy Hocker or Steve Merli handy in your back pocket when exploring Southeast Alaska's wilds. With a grant from Skaggs Foundation, we've found a way to shrink them down—well, almost. Discovery is producing a new series of waterproof, *Discovery Guides to Southeast Alaska*. Written and illustrated by Discovery naturalists Richard Carstensen and Kathy Hocker, these laminated field guides are the perfect 'back pocket' resource for exploring local nature. More than colorful identification keys, *Discovery Guides* provide comprehensive information for the curious naturalist. The first two guides in this series, *Birds* and *Intertidal Animals*, are available starting this summer. You can order direct from Discovery or pick them up from local book vendors and visitor centers. Proceeds from sales of these guides help support our work in local schools.



### Great year for Nature Studies

During the 1999-2000 school year, Discovery Southeast naturalists led more children on Nature Studies field trips than ever before—nearly 1800 kids participating in 12 hours of hands-on learning from nature. With support of parent and teacher organizations at all 7 elementary schools in Juneau, Discovery Southeast naturalists helped every third through fifth grade student, and some K-2's, connect with nature and become better informed about our environment. Thanks to Diane Antaya, Walt Chapman, Kathy Hocker, Brenda Krauss, Steve Merli, and Jane Roodenberg for their



**Above:** Wrangell 5th graders examine skull of very old cow moose, sandbar island in Stikine River. Steve Robertsen's program gets enthusiastic support from local river tour operators, who shuttled the entire 5th grade to this exciting location during Garnet Festival this April. • **Below:** Steve Merli's 'commencement' trip, West Glacier trailhead.

wonderful lessons and passion for nature. Included in their end-of-year activities were full day hikes to Mendenhall Glacier, overnight camps at Methodist Camp and Echo Ranch, and a show-stopper sighting of a LARGE black bear above Gastineau School. Students in Wrangell too enjoyed naturalist Steve Robertsen sharing his creative lessons on local ecology. A highlight for Wrangell students was a day-trip to an island at the mouth of Stikine River with fresh wolf tracks in wet sand. With a grant from James and Elsie Nolan Trust to continue the program next year, and growing local community support, Nature Studies is becoming an integral component of natural science education for youth in Wrangell.



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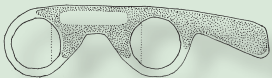
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**Handheld viewer PS 2020:** Included with the original printed version of this Summer 2000 newsletter was a minimalist plastic stereo viewer. If by some miracle you still have yours, here's some pointers.

To see the 3D images, size the pdf on your monitor so that stereograms measure ~6 to 8 inches across both images. Hold the viewer about 9 inches away, centered over the dividing line. Better yet, copy the pdf to tablet, and order a pocket stereoscope. More info and recommendation follows in sidebar *Stereoscopy 101*. Or try 'freeviewing' as explained in the *Winter 1999* issue, page 5.



*continued from page 1*

comparing 1984 aerials to others—from 1929, 1948, 1962 and 1996—we add the 4th dimension, and understand why naturalists speak of natural *history*.

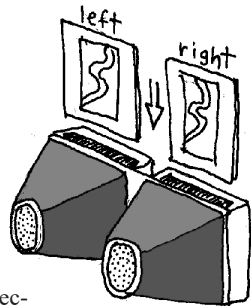
At site **3** is the 900-foot summit of a NNW-trending ridge. Trees are young and even-aged, as a forester can deduce from smooth canopy texture. In 1883, most of the eastern (inland) portion of this hill blew down in a major windstorm, as did forests on hills at **4** and **5**.<sup>1</sup> Small understory hemlock survived as their elders toppled. Today, uniform ranks of these survivors—same-aged and same-height—have grown up to comprise the new forest. Rougher-textured stands on protected lee slopes and sheltered valleys such as **6**, made it through the storm. Largest known tree at Eagle Beach is found here, an ancient 7-foot diameter spruce.

At peak Little Ice Age ~250 years ago, land was 5 to 10 feet lower, depressed by ice in expanded glaciers and thickened icefields. Flat land in the upper (E-side) stereogram was tidal salt marsh. Spruces here have grown to nearly 200 feet. Coastal 'uplift groves' are only ~40 years old and as many feet tall.

<sup>1</sup> More on this storm in *Natural history of Juneau trails*, 2013, p 19.

I first became fascinated with air photos when creating a habitat map for Eagle Beach in the early 1980s. I visited Marc Scholten at Geometronics: mapping division of the Forest Service. Marc positioned 2 air photos on a desk and placed a pocket stereoscope over them. I have a strong astigmatism in one eye, and it took me several minutes before the scene popped up in 3D. But I've been hooked on stereo ever since!

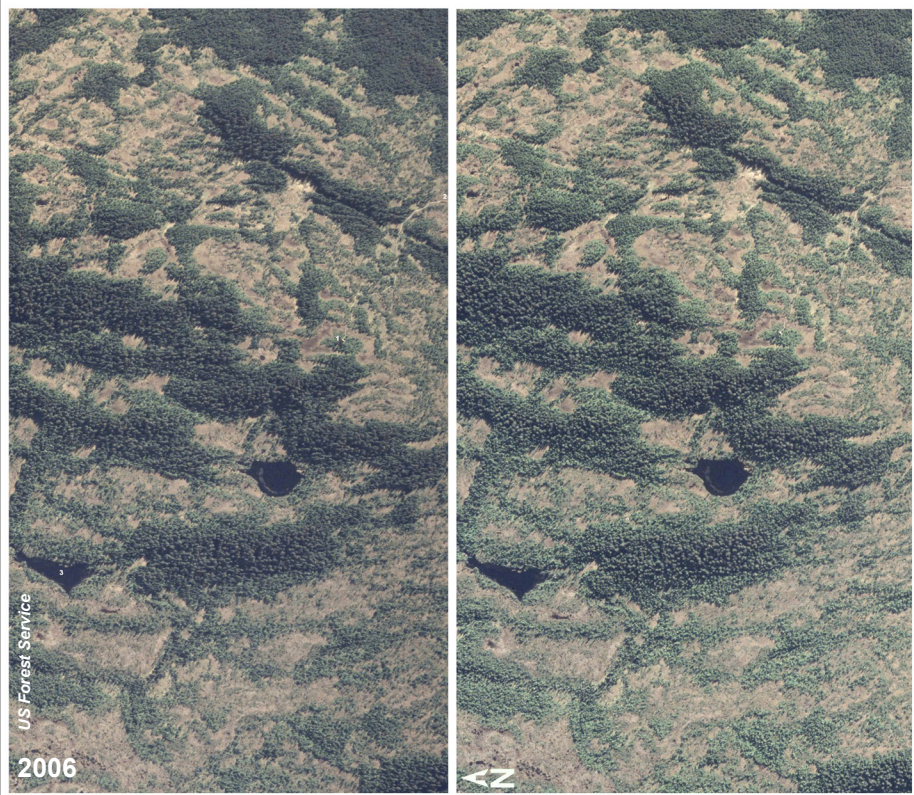
Air photos are expensive in 9"x 9" print form, but if flown by federal agencies like NASA and Forest Service are public domain. Searching for economical ways to build a large photo collection, I discovered that aerial prints in local agency collections could be photographed as 35mm slides and inserted into a tiny 3D slide viewer. This revolutionized my field work and even my 'recreation' (naturalists have a hard time telling work from play). I now have thousands of aerial slide stereopairs, organized in 3-ring binders. The viewer fits easily into a pocket or belt pouch and is more indispensable than compass, map, altimeter or GPS on my bushwacks.<sup>2</sup>



**Muir Cabin peatlands** Open boggy terrain is fun to negotiate using 3D aerials. When it becomes necessary to dive back into the forest, photos reveal least-effort paths to the next opening. A favorite peatland for Juneau skiers is Spaulding Meadows and the rolling hills around Muir Cabin, next page. Using air photos on off-trail excursions gets me into places I'd never otherwise explore. (*"Hey! This strip of trees is only 50 yards wide—and on the other side is another chain of fens!"*) They rarely serve as energy-savers however, because of that tendency to suggest enticing side trips.

<sup>2</sup> PS 2020: Much has happened in the world of cartography and aerial photography since I wrote this article, 20 years ago. I still sometimes use the 35mm slide viewer, especially near home where my collection is most complete. But farther afield, I typically create custom, up-to-date stereograms, and copy them to a 4x7-inch tablet for field & camp use under a pocket stereoscope. Making overlays on one of the paired images is easier than back in the days of hand-annotation. It's also cheaper and less damaging to the 9x9 contact print. For stereogram sheets described in the following postscript sidebar, I purchased prints for razor cutouts. Today, working with 600-dpi scans from those tape-repaired collections, I have to rubberstamp-away the razor lines.





Muir Cabin peatlands. Poorly drained bog and fen at ~1,500 feet allows skiers to wander in any direction. Forest restricted mostly to steeper, better-drained slopes: 1) cabin; 2) lower end of boardwalk; 3) pond at top of Peterson watershed. Largest trees are on steep, NW-facing slopes, in lee of prevailing southeasterlies.

Bog threading with aerials is easy. But photos help even deep in forest. Canopy texture predicts favorable or unpleasant travel condition in the understory below. My friend John Caouette, who makes forest-type maps from photointerpreted Forest Service data, sometimes refers to his creations as the “*bush-wacker’s guide to the Tongass*.” Smooth-textured, even-aged stands—yellow on John’s maps—are usually shady and brush-free. The other extreme, avoided by savvy explorers, are young alder thickets, young clearcuts, and scrubby forested wetlands with wide-spaced, short trees admitting plentiful light to nearly impenetrable blueberry and menziesia. Scrub is easy to recognize on an aerial. Alder and other early-seral brush shows most clearly on color-infrared photos, as a paler pink or peach than coniferous reds and mauves (example in following sidebar). In 3D their shorter stature and lumpy texture is distinctive.

**Trocaadero Landmark Forest** In summer 1996, a handful of Juneau friends started the Landmark Trees Project—an effort to locate, understand and promote the finest remaining stands of giant Sitka spruce in Southeast Alaska. The project was an idea of Sam Skaggs, longtime Discovery supporter, who felt that Alaska’s magnificent forest needed broader constituency. Big trees are potentially as powerful a tourist magnet as glaciers, bears and whales that drive the industry today.

Landmarkers have explored and measured the most remote and awe-inspiring forests on the Tongass. About 30% of our 54 Landmark sites were made known to us by word of mouth. The rest we found by stereophoto interpretation.

Stereograms usually exaggerate the vertical dimension. This makes alpine routefinding intimidating, but is handy when





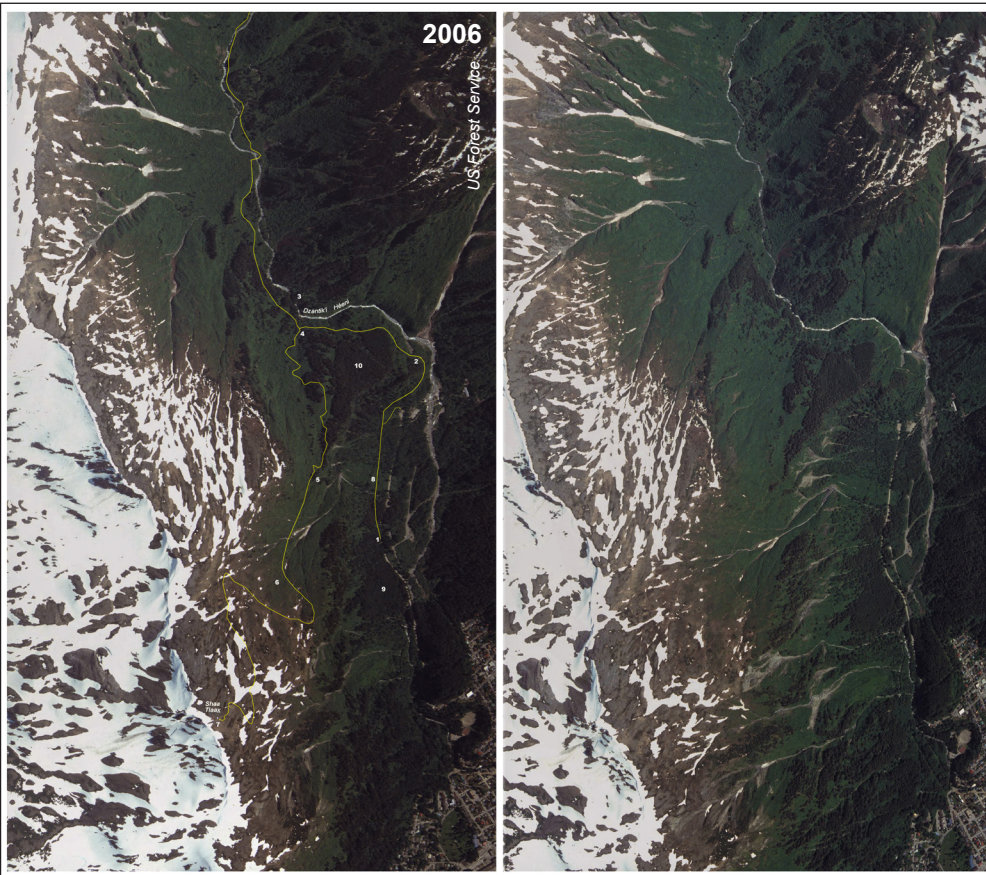
in the 1950s. More recent road-based clearcuts targetted streamside forests in the 1960s and 70s. Only one example of giant-tree forest remains in the Trocadero scene. Labeled **LTs**, it's that dark, coarse-textured patch at bay-head—the first place Landmarkers measured a tree over 200 feet tall. Extensive bayhead mudflats prevented hand loggers with barge-mounted steam donkeys from cabling out giant trees. By the time Hydaburg Road was punched through, logging of streamsidings and beach fringes had been prohibited on the National Forest.

**Dzantik'i Héeni basin trails** are favorite evening strolls for 'townies.' This stereogram of the lower basin and Shaa Tlaax, *moldy top* (Mt Juneau) <sup>3</sup> tells of severe and regular disturbance, both human and natural. Only on a few isolated slide-free buttresses can truly old trees be found. But rawness is part of the basin's unique appeal—a deciduous watershed in the land of conifers.

Primary disturbances here are snow avalanches and rock slides. Flooding in valley bottom further ensures

<sup>3</sup> PS 2020: For the most part I've retained IWGNs (important white guy names) from the original publication in this revised edition. But here, it seemed more respectful to use the Lingit for these important landmarks: Dzantik'i Héeni, *stream of little flounders*, is the pre-Euro, more organic name for Gold Creek. Confusion ensued from applying this downtown name to a middle school, 5 miles NW in Shaanáx Tlein, *big valley* (Lemon Creek basin).

Dzantik'i Héeni basin, 2006. Shaa Tlaax trail overlaid in yellow. Numbers first proceed from trailhead to summit: **1)** trailhead **2)** gulch overlook **3)** Ebner Falls **4)** Shaa Tlaax trail turnoff **5)** highest conifers **6)** avalanche bowl **7)** Shaa Tlaax summit.



youthfulness of vegetation. Every century or less, the successional clock gets set back on almost every acre of the watershed. Freshest slide fan along the lower trail is at point 8, where alder, willow, cottonwood and red osier dogwood ring with songs of warblers and Swainson's thrushes. Last big slide here was in 1972.

The few conifer stands in this stereogram are darker and taller than encompassing alder/willow thicket. Smooth-canopied forest at 9 is even-aged, about 2/3 hemlock, with cut stumps from mining days; historical aerials show an almost treeless landscape. An equally smooth-textured forest on the east face of The Horn (10) stands right in the path of down-valley Taku winds; these are mostly even-aged windforest

## Stereoscopy 101 2020 update

Whenever I pass around my old-fashioned 35mm-slide 3D viewer on field trips, or mount a pocket stereoscope over my tablet during indoor workshops, those who've never experienced landscape stereo are amazed and appreciative. Most would probably use stereograms routinely for navigation or geographic investigation, except for the obvious challenge of **access**. Assembling your own stereograms is not rocket science, but in the digital age (*ie*, post-scissors-&-glue), it helps to have 1) basic GIS skills, 2) fluency in an image-editor like Photoshop, and 3) contacts in local agencies archiving 'raw materials,' eg USFS, CBJ, or DSE's cartography division (*ie*, me :).

• **Where can I find public domain air photos?** In 2000, I couldn't have foreseen how easily anyone with a phone or computer would someday bring up hi-res air photos for any place of interest in the world, using Bing, ArcGIS Online, or Google Map's "satellite" view.<sup>1</sup> These apps serve up seamless mosaics of 'orthophotos.' But for stereo, we need the original unrectified component images.

• **Hold on; what's an orthophoto?** It's a nadir (downward-facing) aerial image, scaled and projected (*ie* 'rectified') for display in a mapping program. An *orthomosaic* is composed of many separate images taken at intervals along flight lines such that every point on the ground is captured by at least 2 photos. Fortuitously, this provides 3D views throughout the ~60% overlap zone. Index on right shows overlap for photos 236 and 237, used in the Basin stereogram.

<sup>1</sup> Actually, they aren't satellite images, but mosaics from lower elevation aerials.

• **Why is north left in these stereograms?** Although maps are traditionally displayed north-up, this isn't possible when successive images are taken on north-south flight lines. Your left eye needs to see photo 237 while your right eye sees 236.

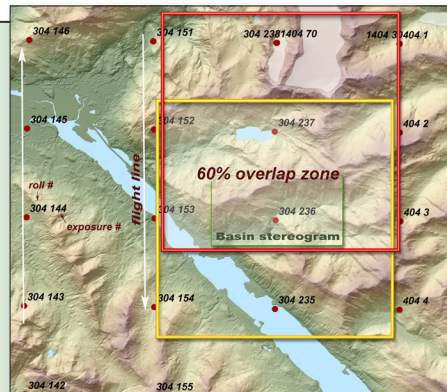
• **Where do I buy a stereoscope?** Ward's and Forestry Suppliers sell em. Get one that looks like this. Don't mess with the all-plastic "student models;" they have sucky lenses, not even as clear as the cheap handhelds we mailed out in 2000.



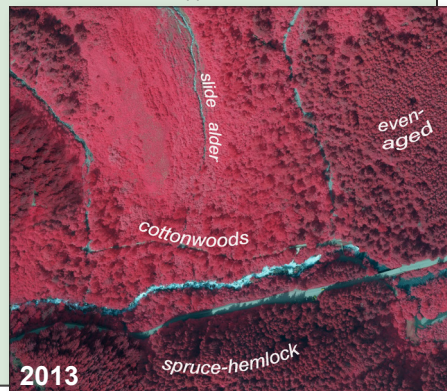
• **Where are the unrectified aerials archived?** I've copied recent and historical digital photofolders from cartography departments at USFS, ADNR & CBJ. They're all public domain, and I'm happy to share em if you have space on a hard drive.

• **Once acquired, how do you assemble a stereogram?** In this Basin example, I used the centerpoint index in ArcMap to identify 2 photos nearest to my area of interest. For the Trocadero pair, I wanted the stereogram to have a cutting-unit overlay, so I first georeferenced the overlapping 'raw' image pairs before exporting.

Rotating photos #236-&-7 90° left, I cropped out an area at the extreme edge of photo 237. Working at this outer edge does induce distortion, especially in scenes with extreme relief. Trees appear to lean outward, and mountains like Shaa Tlaax may 'warp' bizarrely. In the Basin stereopair, Dzantik'i Héeni illogically 'climbs' onto sideslopes downstream from the Mining Museum.



**Above:** Index of photo centerpoints. Basin stereo in green falls within overlap zone for photos 236 & 237. • **Below:** Hi-res color infrared ortho-mosaic. Note differences in apparent direction of tree lean.





hemlocks ~150 years old. There are stumps from hand-logged trees as high as 1,200 feet on The Horn. Trees were dragged from here down to Perversion Trail at 700 feet.

I've selected these 4 stereogram scenes as a sampler of ways to use 3D air photography: from bushwacking aids to big tree hunting to tracing of old river meanders, human impacts, and avalanche paths. Proficiency with air photos is just as useful to the naturalist as animal tracking skills, or birding experience, or knowledge of edible plants. It's surprising how few outdoorspeople take advantage of these '*ultimate maps*.' Certainly, if aerial stereopairs were as easy to acquire and use as a USGS topographic map, we'd soon see folks on the trails (even tourists downtown!) staring into little 3D slide viewers. Who knows; maybe in a few years those viewers will bear a Discovery Southeast logo! Meantime, we'll continue to promote birds-eye perspectives through this newsletter.

Let us know how the viewer and stereograms work for you. Your feedback will further our campaign for topographical literacy.

## Postscript, 2020

From photography's earliest decades, stereopticons and their technological successors (think *Avatar*) have waxed and waned in popularity like clothing fashions.<sup>1</sup> Twenty years ago, after mailing out several hundred handheld stereoviewers to Discovery members with the printed version of this newsletter, we received little feedback, so I only included stereograms for a few more issues.

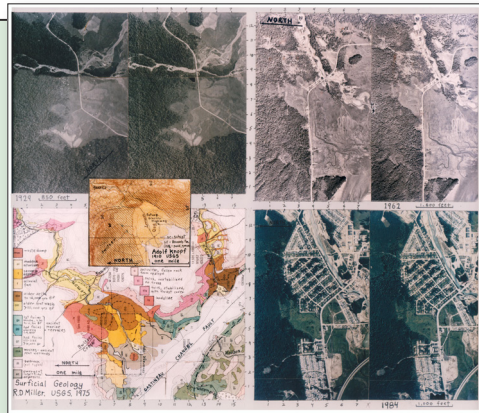
But stereo-education persisted in several forms throughout Discovery's 30-year (and counting!) evolution. For Nature Studies programs in several of our schools, we purchased enough stereoscopes for use with a full class. Printing out full-color, high-res stereogram sheets, I added coordinates along the margins. This allowed everyone to study landforms and forest texture together, communicating location as 'over-&-up:' B6, Q14, etc. Colleague Cathy Connor—UAS geology prof and longtime Discovery supporter—commissioned more stereo-sheets on geo-themes for her undergraduate classes. On field trips for all ages—elementary through professional-development workshops—the little plastic 3D slide viewers were passed around as bushwacking aides and puzzle-solving resources.

With the advent of digital photography only a couple years after publication of this newsletter, 35-mm slides gradually became passé. Ironically, computers, GIS, and the seduction of screen-based cartography have tended to render stereointerpretive skills 'old-school.' One problem is that monitors are fairly low-res. If you hold a 2-power pocket stereoscope to it, the stereopair will pop up in 3D, but may look unappealingly 'screened' or pixelated.

The solution came with higher res tablets and phones (though the latter are a bit small for optimum viewing). Open this newsletter with a pdf-viewer app on your device, lay it flat on the table, and mount a 2x pocket stereoscope over it. Pinch-zooming in and out, you'll see forests and topography in wonderful, immersive detail.

Alternatively, dig out that plastic handheld viewer you received 20 years ago—which you carefully saved with all your *Discoveries* back-issues, right?—and study the stereograms right here on your computer monitor. The lenses on that little tool are 1x, not 2x, which is actually a better match for the low-res screen.

<sup>1</sup> [http://juneanature.discoverysoutheast.org/content\\_item/documenting-change-through-repeat-photography-in-southeast-alaska/](http://juneanature.discoverysoutheast.org/content_item/documenting-change-through-repeat-photography-in-southeast-alaska/)  
History of stereoscopy is on pages 33-38.



Pre-digital stereogram sheet for Dzantik'i Heeni Middle School. Paired images were razored out of adjacent 9x9-inch contact prints and glued to card stock, then color-copied. Coordinates allow a class to communicate locations while looking at the images through stereoscopes. This set has pairs from 1929, 1962 and 1984.





2019

**Left:** Young spruce  
on raised tideland.  
Camera moved  
less than a foot.

**Right:** Drone  
stereo, Kuiu  
Island. Screen  
grabs from video,  
~1 or 2 seconds  
apart.

## Make your own 3D pictures

PS 2020: I've updated this how-to page to reflect the advent of digital photography, which makes custom stereo even easier than scissors & glue. If you're comfortable with photo-editing programs such as Photoshop, you'll have no trouble laying up adjacent photo pairs.

If you've ever taken a picture with a phone or camera, you're ready to make 3D pictures. Just take 2 pictures of the same scene or object, moving the camera sideways between photographs. How far to the side? Depends whether your target is close or far away. For a vase of flowers at the far end of a table, only move 2 or 3 inches. For a house across the street, try moving about 2 feet. Try to show exactly the same area in each shot.

Best configuration for stereo is vertical, or 'portrait' format. Before 'locking-in' your 2 stereogram panels in Photoshop, make a quick screen-check to see if you've got em

backwards. When you switch right and left photos, mountains look like valleys and pits look like mounds. Photographing people in 3D is also easy, but they must hold still between the two photographs, or else they'll come out blurry, like ghosts.

There are few limits to the scale or orientation of stereo photos. These show just a few of the possibilities. I've taken red-mite moss-jungle stereo-scenes less than an inch across. In addition to drone-based stereo, below, I also take paired oblique photos from float planes. Shoot as fast as possible when skimming the treetops; at 5,000 feet, you can wait several seconds.



2019

## Vanderbilt Creek Stewards: Education meets restoration

Development has taken a toll on our salmon streams. Vanderbilt Creek for example, once productive coho rearing habitat, is now listed by DEC as an impaired waterbody. Its headwaters were mined for gravel, then paved over for Costco parking. Lower reaches were channelized along Glacier Highway and culverted under Egan. Banks were logged and graveled for parking pads and heavy equipment staging areas. Orangish, iron-fixing bacteria leach from disturbed soils and choke the gravel beds.

Yet when Ken Leghorn moved the new Alaska Discovery headquarters to a property adjoining Vanderbilt Creek, he was impressed by the tenacity of life in this impaired stream. He committed to enhancing stream habitat. A founder of Discovery Southeast in 1989, Leghorn recognized the educational value of a restoration project for local youth, and for Alaska Discovery visitors starting their itineraries in Juneau.

This winter and spring, with funds provided by Alaska Discovery, Discovery Southeast naturalist Richard Carstensen worked with 8 students from Dzantik' i Héeni Middle School to monitor water and habitat quality in Vanderbilt Creek and start habitat restoration projects along the banks of this neglected stream.

In April, joined by biologist Kevin Brownlee of ADF&G, the students collected native plants and bound together willow bundles to undertake a stream bank restoration project.



By staking down willow bundles at water level, and by planting marsh marigold, sedges and bullrush on the sand bar, the students stabilized banks.

With a grant from the Alaska Fund for the Future, Discovery Southeast and DZ students will continue with research, water quality monitoring, and stream restoration along Vanderbilt Creek. Funding is being sought to support the Vanderbilt Creek Stewards project throughout next year.

