

## Background

Twenty parrot taxidermy mounts will soon be on display in a permanent exhibit within the new *Richard Gilder Center for Science, Education, and Innovation* at the American Museum of Natural History (AMNH), featuring thousands of objects from the Museum's scientific divisions. The parrot array will be showcased alongside graphics exploring the evolution of color, the ways in which color affects behavioral patterns of birds, and the importance of color for survival.

In preparation for display, some mounts required only gentle cleaning and preening to reposition disorganized feathers and rezip disengaged barbs. In other cases, once-bright red, orange, pink, and yellow feathers were severely faded or lost altogether, undermining the naturalism of these mounts. Color is a central theme in the stories that accompany the array, so compensating for these faded biopigments became an important consideration in treatment. Developing suitable treatment approaches required collaboration between Natural Science conservators and the Department of Ornithology and drew heavily on recent research conducted as part of an IMLS-funded research project focused on the care and conservation of feathers.

## Materials and Methods

We considered three general approaches to loss compensation for faded color and/or missing feathers:

- Direct recoloring of faded feathers using applied colorant(s)
- Replacement of lost feathers with fills created from cut, shaped, and colored commercial feathers
- Colored fill feathers inserted on top of existing faded feathers

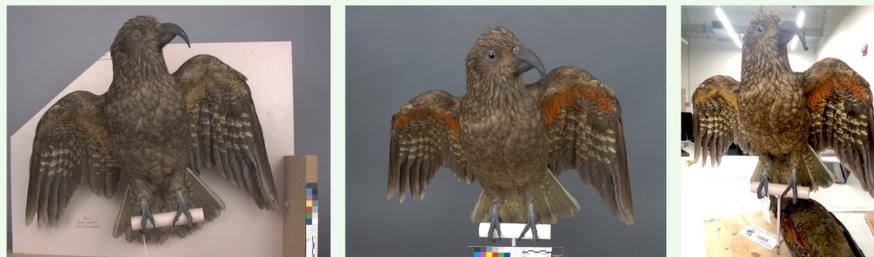
Each approach requires the use of reference materials. Well-preserved study skins of the same species usually provide the best references, reflecting the range of natural variation in color. Images are also useful, though color can be inaccurate and fine features like texture, gloss, and iridescence are harder to interpret in a graphic format.

Two colorants investigated during research were selected for use in this project.

## Case Studies

### Direct Recoloring of Faded Feathers

In consultation with AMNH Department of Ornithology curators, direct recoloring was selected for three specimens. Study skins were provided for color reference. QoR Modern Watercolor paints in ethanol were applied by brush, with blotter paper placed under the feather, providing the desired satin finish on these pennaceous feathers.



Kea before treatment (left), after treatment (middle), and during treatment with study skin (right).



Gray Parrot faded mount with study skin (left), before treatment (middle), after treatment (right).

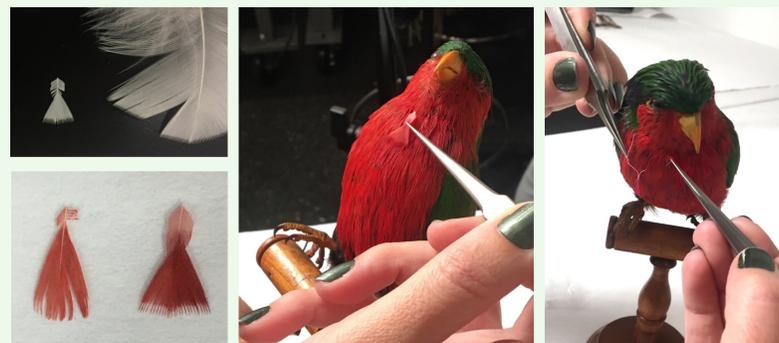


Black-Headed Parrot before treatment (left), after treatment (middle), and during treatment with study skin (right).

QoR Modern Watercolors, Golden Artist Colors	PanPastel Professional Quality Pastels, Colorfin
 <ul style="list-style-type: none"> <li>• Paint (tubes or pans) containing pigment bound in Aquazol® (poly(2-ethyl-w-oxazoline) which can be matte or satin</li> <li>• Soluble in ethanol (water at any concentration can cause barbule deformation in deteriorated feathers)</li> <li>• Easily reduced with alcohol for future retreatment, if needed</li> <li>• Translucent color can help to impart luminosity</li> <li>• Good color palette</li> <li>• Readily blends to achieve the right color</li> <li>• Flexible application: diluted/concentrated, brush/airbrush, etc.</li> <li>• Does not transfer when dry</li> <li>• Not fully reversible (though highly reduceable)</li> <li>• Can adhere barbules together if too much binder is used, making colored feathers more difficult to groom</li> <li>• Translucent colors may not fully cover stubborn soiling</li> <li>• If diluted to a wash, they wick up the vane, making it more difficult to get a hard line of color</li> </ul>	 <ul style="list-style-type: none"> <li>• Highly pigmented (low binder) soft pastel in a pan format</li> <li>• Dry application with no solvent needed</li> <li>• With effort, can be somewhat reduced by vacuuming through a cleaning cloth for future retreatment, if needed</li> <li>• Maintains velvety appearance of plumulaceous feathers</li> <li>• Very broad color palette</li> <li>• Opacity permits more coverage of stubborn soiling</li> <li>• Can be applied with sponge applicator or various brushes</li> <li>• Particles held between barbules, so feathers remain soft</li> <li>• Not fully reversible</li> <li>• Opaque color may not provide desirable translucency or luminosity</li> <li>• Blending is more easily done in situ than before application</li> <li>• Transfers with handling (i.e. grooming, cleaning, etc.)</li> </ul>

### Replacement of Lost Feathers

The **Rimitara Lorikeet** displayed both fading and loss of its fine red chest feathers. Existing body feathers were recolored using QoR paints, gently applied by brush. A light layer of PanPastel applied on top with a sponge was needed to impart a velvety texture. Areas of loss were filled to cover underlying grey-brown downy feathers. Fills were constructed from white semi-plume turkey feathers cut, shaped and toned with QoR paints.



A fill cut from a turkey feather (top), then colored with QoR paints (bottom). Inserting a fill with trimmed barbs. A fill threaded with nylon floss for insertion.

The **Buff-Faced Pygmy Parrot's** face was denuded of feathers behind the eye, leaving bare skin. Fills were similarly constructed from toned semi-plume turkey feathers and adhered to Hollytex.



Buff-faced Pygmy Parrot before treatment. Fill feathers secured to Hollytex. Buff faced Pygmy Parrot after treatment.



Rimitara Lorikeet before treatment (left), after treatment (middle), and study skin (right).

Three methods of mechanical attachment were trialed and found successful. In the first, the fill was cut with a long rachis on which the lower barbules were trimmed to a few millimeters. When inserted among adjacent body feathers, these shortened barbules catch and secure the fill in place. In the second method, a piece of toned nylon floss was threaded through the trimmed barbules or adhered to the rachis of the fill feather and then woven through adjacent feathers in situ to secure the fill. In the third, toned fill feathers were attached to a strip of Hollytex, which was secured to the area of loss with 3% methylcellulose in deionized water.

### Overlying Fill Feathers

Pennaceous turkey feathers were colored with QoR paints to imitate **Red-Tailed Black Cockatoo** tail feathers. Placed over original faded feathers, the fills protect them from further color loss.



Study skin of a Red-Tailed Black Cockatoo (left) and turkey feather colored with QoR paints (right).