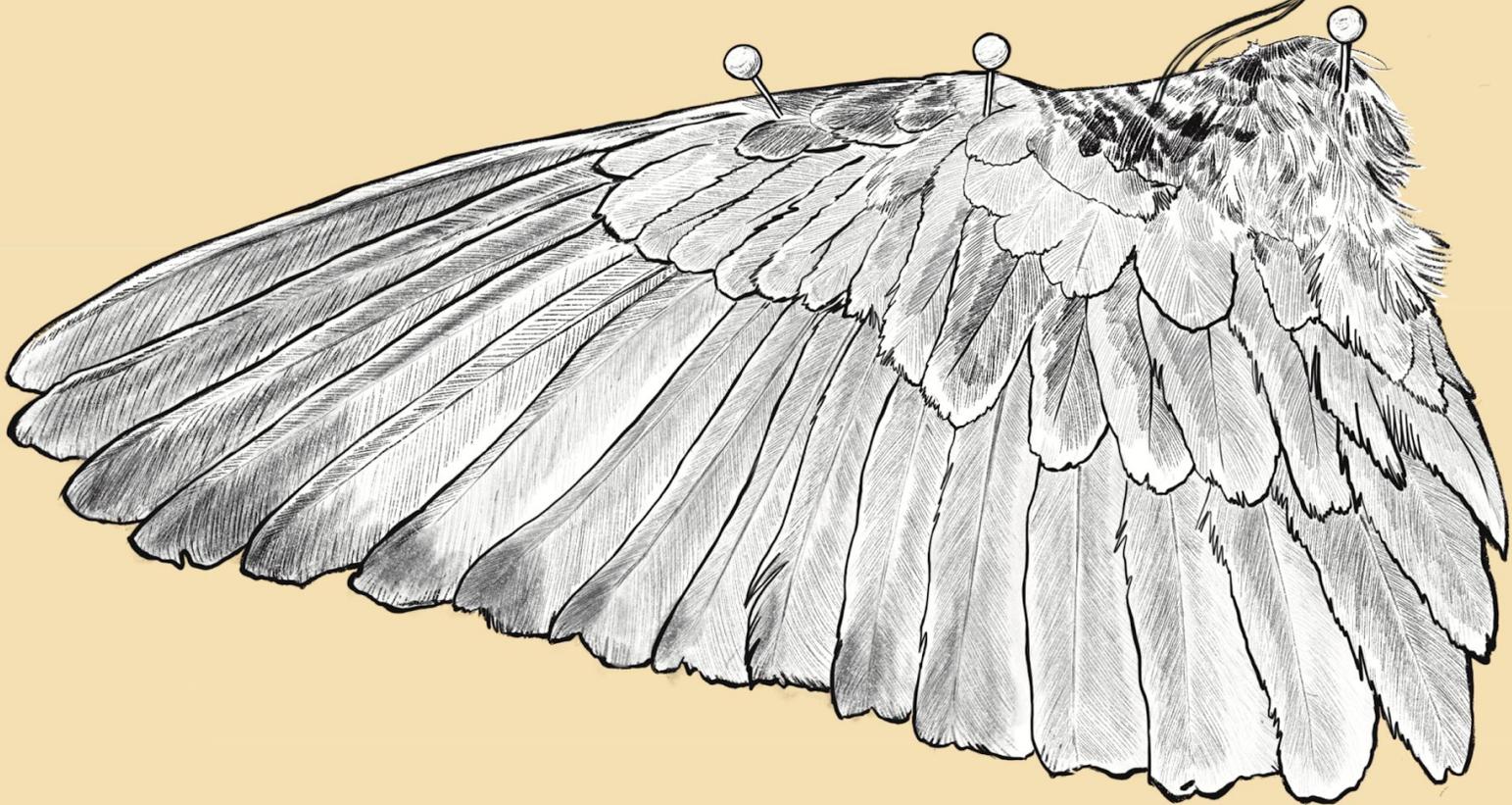


How to Prepare
a Bird Spread Wing



**A MANUAL FOR PREPARING
SPREAD WINGS FOR BIRD SPECIMENS**

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How to Prepare a Bird Spread Wing

This manual has been designed to lead you through the process of preparing a spread wing for a bird specimen.

Further reading on preparation of full bird skins and skeletons can be found in many museums and teaching collections, as well as published methods. There are many different styles and methods for preparing bird skeletons and skins. Visit the [AOS Permitting and Collections Resources, Training and Meetings](#) page for further resources.

Be aware this list is in no way exhaustive!

Which Wing?

A spread wing can be prepared in conjunction with a partial skeleton or a skin. The type of prep (skeleton or skin) you are planning on doing for the specimen will dictate how you prepare your spread wing.

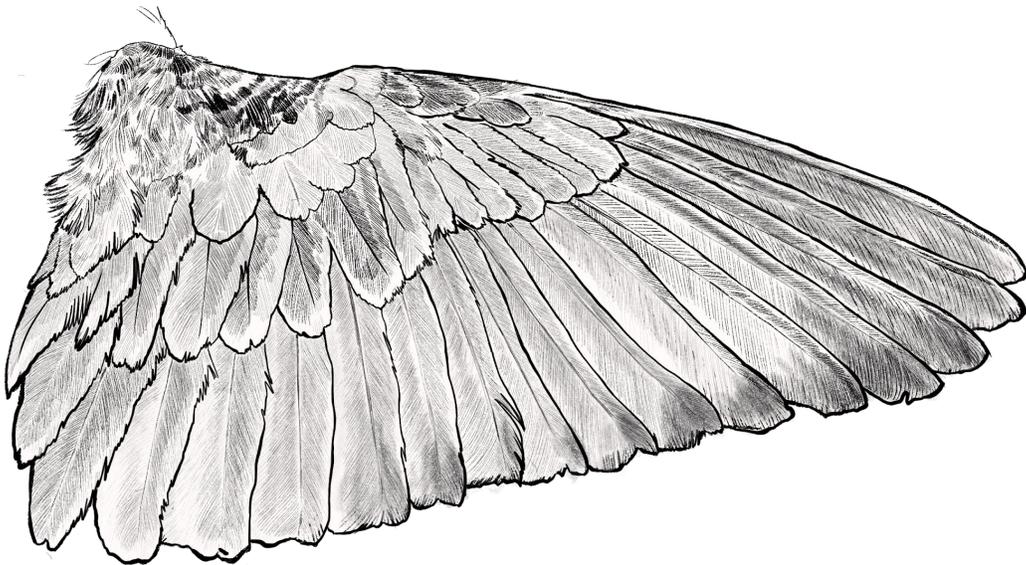
Carefully examine your bird to determine which wing will be the best candidate to save for a spread wing.

Factors to consider:

- the condition of the feathers
- the condition of the molt
- the color present on the wing
- the structure of the underlying bones

There is no one correct answer for any of these conditions, and each bird will be different.

For example, if your bird has a broken humerus on one side, then you may want to take that wing since the bone is already broken there. On the other hand, if your bird has a broken ulna and radius on one arm you may not want to take that spread wing, since it might be difficult to do the repair to keep the spread wing stable after it dries.



For a Partial Skeleton

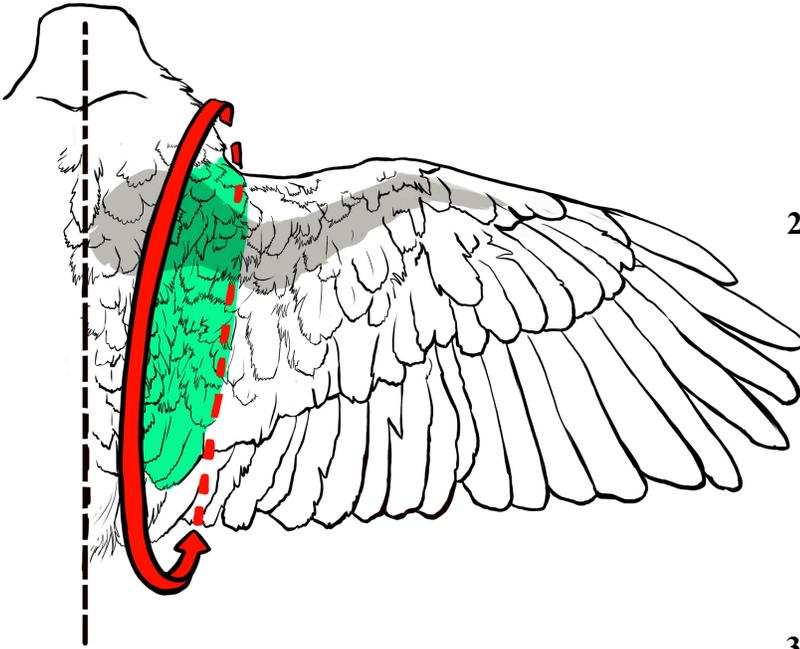


Figure 1: Highlighted scapulars should be included with the detached wing.

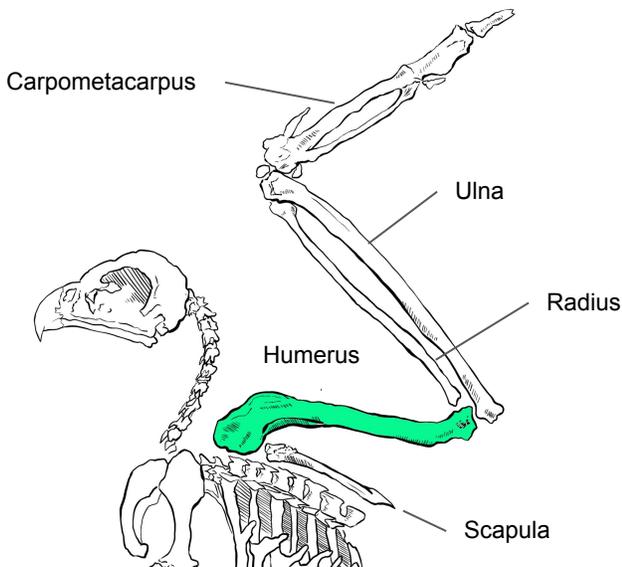


Figure 2: Bones of the wing. The highlighted humerus is the bone that is cut to detach the spread wing.

1. After selecting your wing, identify where the scapular feathers are. You will be cutting the scapular feathers away with your wing for a partial skeleton.
2. Start to skeletonize your bird by stripping the skin and feathers away from the main body only (not from the wing). Clear the skin up to where the scapular feathers are, making sure not to tear the skin under the scapular feathers. Carefully work in a circle around the shoulder of the bird until you can see the joint between the humerus and scapula.
3. Cut the skin below the scapular feathers so it (and the scapular feathers) will be separated with the wing when you cut it off.
4. Make sure that you work in a circle around the shoulder of the bird when cutting the skin. **Be generous with how much skin you cut for your wing.** It is easier to cut excess skin off, then to try and sew it back on!
5. Cut through or detach the humerus from the body.

TIPS

- Add sawdust under the skin of the opening on the wing to keep blood and fat from seeping onto feathers.
- If needed, place the detached wing back into the freezer to prep for a later date. Remember to put a finished tag in with the wing, so people know which specimen it is.
- Cleaning, sewing, and pinning the wing are the same for all prep types. Please jump to the Section [Cleaning the Wing](#) for the next steps.

For a Round Skin

These are instructions for removing a spread wing when preparing a skin in the style with attached secondaries (see *Berkeley Museum of Vertebrate Zoology Basic Bird Skin Preparation Manual*). They should work if you detach your secondaries during skinning, but you will need to employ a button stick in the skin.

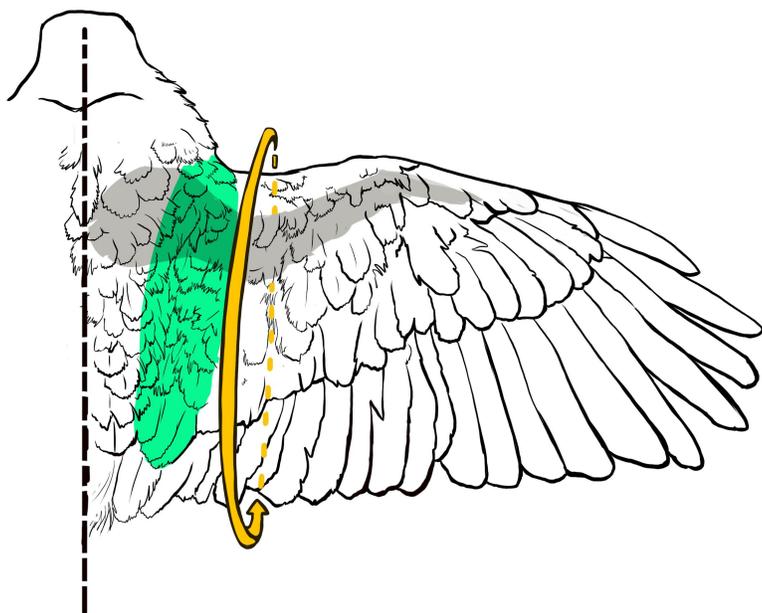


Figure 3: Highlighted scapulars will NOT be included with the detached wing.

TIPS

- To help part the feathers so you can see clearly, wet the feathers gently with water or 70% ETOH.
- Cutting in a circle instead of straight through will help you make sure you stay on one side of the feather tract and do not accidentally cut additional feathers or parts of the skin by mistake.

1. Skin your bird as normal, and set the skin aside while you collect tissues and take internal measurements. You will remove the wing from the skin later.
2. Carefully examine your bird skin to determine which wing you will want to remove and save. Some things to consider are:
 - a. the condition of the feathers, the condition of the molt, the color present on the wing, the structure of the underlying bones (see Which Wing? for more examples).
3. After you have selected your wing, carefully identify where the scapular feathers are. **You will NOT be cutting the scapular feathers away with your wing for a round skin or alcohol.**
4. Part the feathers between the scapular feather tract and the feathers of the wing. Detach the wing by cutting the skin in this apteria. Cut in a circle starting around the top of the shoulder and working around.

For a Round Skin...continued

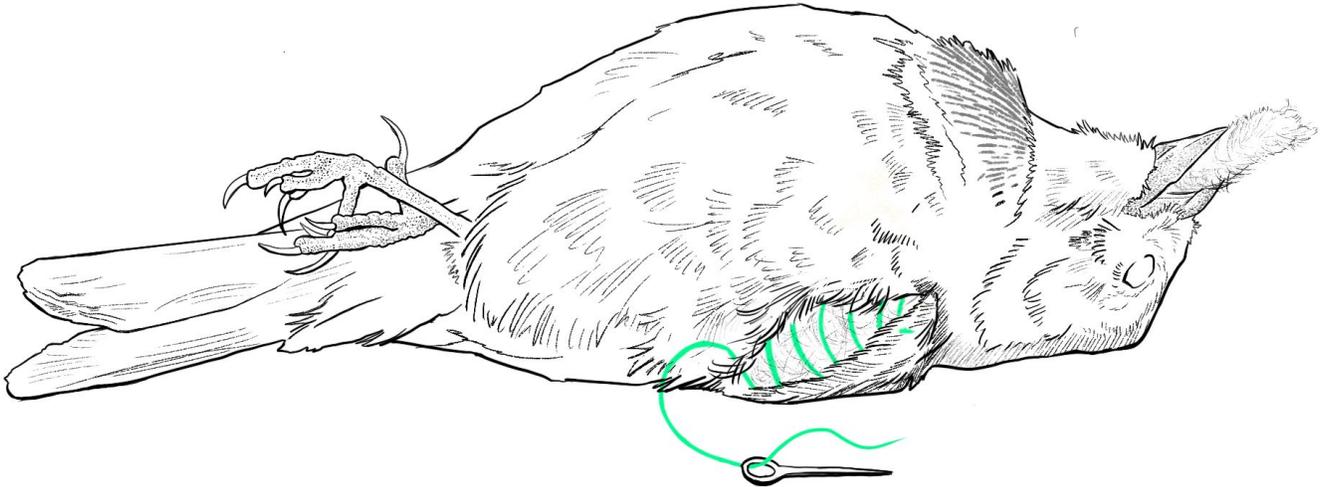


Figure 4: Stitches for sewing the gap on a round skin

5. Set your wing aside while you sew up the hole on the skin. When sewing up the hole in the skin, make sure you do not cinch the opening tightly closed.

Remember that you removed a pocket of space from the skin, where the humerus exited the body around the shoulder. In order for the feathers to fall correctly on the round skin, you will need to simulate this missing space when you sew the opening closed. If you do this correctly, the feathers will fall naturally from the scapular tract and the side of the chest when you stuff your bird and cover the hole.

- You can set your skin aside and focus on your wing after this step, or vice-e-versa. Or, you can put both into the freezer to finish at a later date. **Remember to put your completed tags in with the skin and wing!**
- When you are ready to stuff your bird, stuff it as you normally would. The humerus on the remaining wing will allow it to lay correctly on the round.

Cleaning the Wing

You can clean your wing after you have detached it from both a skeleton and skin, but it is often faster to clean the wing before you detach it. The most important thing to remember when cleaning the muscle from the wing is **DO NOT DETACH THE SECONDARIES** from the ulna and radius. Keeping the secondaries attached will help the feathers fall in a natural fashion, and will save you a ton of time and effort during pinning.

When cleaning out the muscle from the wing there are two areas you need to pay attention to the: 1) the humerus, and 2) the ulna and radius. It helps to have sawdust or other absorbent material on hand to keep the feathers as clean as you can.

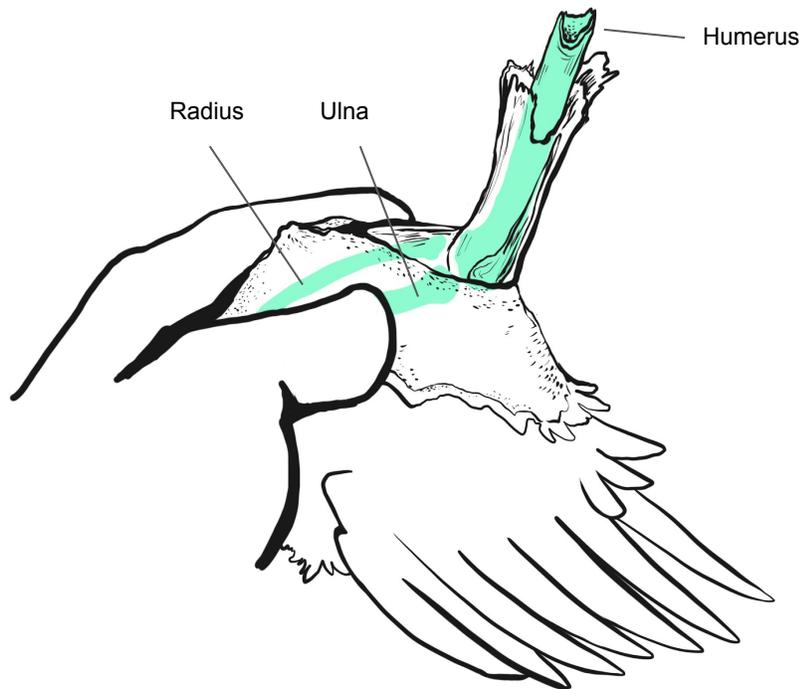


Figure 5: Pushing the skin down towards the elbow joint to expose the muscle attachments at the end of the humerus. Underlying bone structures are highlighted.

Cleaning the Humerus

The humerus is the bone you cut through to detach your wing.

1. Push the skin down in a circle from the cut opening you made around the bone.
2. Work your way down to the elbow joint. Do not push the skin past the elbow joint, otherwise you may accidentally detach the secondaries. Push the skin far enough down so you can see the white of the tendons that attach the muscle to the end of the humerus.
3. If you cut the muscle at the tendons, you can peel each muscle off in one large piece.

Cleaning the Wing...continued

Cleaning the Ulna & Radius

This will differ if you are working on short-winged or small bird, versus a large and long-winged large bird.

For short-winged birds the easiest method is to push the skin down the arm from the dorsal side. Make sure you leave the skin in place below the elbow joint and push it down along the radius, creating a “V” opening as you go.



Figure 6: Creating a “V” opening along the dorsal edge, following the radius. Push the skin along this interior edge.

1. Gently loosen the skin along the exterior and interior edges of the wing to help open up the V and push it open towards the carpal joint.
2. You can stop when you see the white tendons connecting the muscle to joint connection between the carpometacarpus and the ulna and radius.
3. When loosening the skin along the sides of the wing you can push the skin further on the interior edge. The exterior edge will have the secondaries attached to the ulna, and as you loosen the skin you should see their attachments to the bone. **STOP when you see these attachments. Remember do not detach the secondaries.**
4. Cut the tendons at the connection between the carpometacarpus and peel the muscle back towards the elbow joint. Make sure you get the muscle in-between the ulna and radius, and the muscle under the radius as well.
5. When you are done, the skin should still be attached at the elbow, along the radius, and through the carpal joint for the wing.

Cleaning the Wing...continued

For long-winged large birds (e.g. pelicans, cormorants, terns, condors, etc.) you are not able to safely push the skin down the ulna and radius far enough to clean the wing. Instead, it is easier to slit the skin on the interior side of the wing with a razor blade or scalpel.

1. Make one cut from the elbow – passing along the space between the ulna and radius – ending at the edge of the carpal joint where you can see the tendons.
2. Carefully peel the skin back and clean the muscle out from the slit.
3. Sew the slit back together using small stitches, making sure you have not caught any feathers in the stitches.

For a video and in-depth explanation of how to clean wings, you may refer to the: [University of Wyoming Museum of Vertebrates demonstration](#).

Washing the Wing

Often, wings need to be washed to clean blood, dirt, and fat from the feathers. If your bird had a lot of fat it is highly recommended you wash the wing even if it looks okay. Washing will remove some of the fat so it does not seep out of the wing later and discolor the specimen. If your wing needs to be washed, clean it before you sew it up. That way, water will not be trapped inside.

There are many different ways to wash bird skins, and special chemicals and materials can be used for really fatty and troublesome birds. Check with your lab on the methods they like to use before you start.

Washing your wing is similar to how you would wash a bird skin. If you've never washed a bird skin before here are the things we use: gentle dish detergent, cool to lukewarm water.

1. Fill a basin with a small amount of detergent and water, making sure you've dissolved the detergent in the water (create lots of bubbles).
2. Place your wing in the basin and let it sit for about 5-10 minutes (this helps loosen any caked on material). Gently run your fingers through all the feathers making sure the soap gets around every part of the wing. Run your fingers along the grain of the flight feathers so you do not bend the barbs or the shafts.
 - The motions for washing a bird wing are similar to hand washing a silk shirt. Be gentle and slow in your movements.
 - You may need to wash a wing several times to get out particularly tough stains. Simply empty the basin and start again.
 - Gently scrub the soap into the feathers along the cut openings of your wing. This helps remove any fat and blood that seeped through when you were making these incisions.
3. Rinse your bird wing three times with clean water. You do not want any soap to stay on the feathers, as it will keep the feathers from fluffing when you dry the wing.
4. When drying your wing we use a hair dryer with a cool/cold setting and compressed air. (Check with your lab to see what they may use).

Washing the Wing...continued

4. Run the air evenly over both the front and back of the wing in sweeping motions until the feathers fluff up again. This will take time, be patient.
 - You can toss your wing with sawdust or another absorbent before you start to dry the wing. This can help get rid of some of the water.
 - A toothbrush can sometimes help to fluff up edges of contour feathers or down feathers. Gently run it along the feathers while directly the air on that area.

5. When drying, make sure you pay attention to the skin under the feathers. You want the skin to stay supple and moist. If the skin starts to crinkle or feel like tissue paper take a little water and wet the underside of the skin again.
 - Dry skin will tear really easily, and you cannot sew it together. Tissue paper like skin is not your friend!
 - Over dried skin will also have a tendency to create cowlicks and make the feathers not lay correctly.
 - Try directly the stream of air on the outside of the feathers and not towards the opening in the skin to prevent drying.

Sewing the Wing



Figure 7: Circular path for sewing up a spread wing

When you sew up your wing you will be sewing the skin around the cut portion of the humerus. Check to make sure the skin will stretch completely around the end of the bone. If it does not you can trim some of the bone away.

1. Sew closed the round opening of skin to close the hole and hide the bone. We like to start from the top of the wings shoulder and work our way down, but you can also work your way up.
2. After you have closed the entire hole, place some additional stitches in the skin to cinch the hole into a tighter constricted oval or circle (like a drawstring pouch). This will give you a nice fluffy end to your wing.
 - Use sawdust to help absorb any fat or blood so it doesn't get on the feathers of your wing while you are working.
 - Do not cut away too much of the humerus. You want enough in the wing that the skin will be nice and taught when you extend the wing out.

Pinning the Wing

Before pinning the wing, take some time to think about how you want your wing to look. You can pin your wing in any position you like. Here are some possibilities:

- Pin the wing partially closed to show off a color spot or wing bar.
- Pin the wing so the feathers are hyperextended (i.e. past what would be natural for the bird). This type of pinning is often used to highlight where specific remiges are, since there will be big gaps between them.
- Pin the wing in a full natural spread. This would be the position the bird would have if it was gliding or soaring.
 - o This is the one we do most frequently.
 - o To figure out the shape before pinning, look at images of the species in flight.

Where to Tie the Tag

With the above method you will need to sew the tag through a portion of the wing. Consider how large and sturdy the wing is when you choose where to put the tag, and look at previous spread wings in your collection to see if there is a specific placement for your museum.

No matter what we do, someone will try and pick up the wing by the tag. To prevent the tag being ripped out of the wing, make sure you place it somewhere that will withstand this weight.

- For small birds sew the tag closer to the elbow joint.
- For larger birds you can sew the tag closer to the end of the humerus.

Pinning the Wing...continued

Placing the Pins

For most small to medium wings you need three pins to hold your wing in place. Each of these pins will be placed in a joint of the wing. Make sure to set the pins in this order:

1. Place one pin around where the missing humerus joint would be. This is your *anchor* pin. Make sure that you pin close to or through the remaining bone from the shoulder area. This will help provide stability.
 2. Preen the feathers around the sewn scapular feathers (if from a partial skeleton) or the tertial feathers (if from a round skin). What feathers should be on the underside of the wing, and which should be on the top? This is your last time to make this decision and get them in the arrangement you would like.
 3. Place one pin through or near the carpal joint. This pin will help you stretch out your ulna and radius, and determine the placement of your secondaries.
 4. Place the last pin through the bones of the hand/fingers. This pin will determine the spread and reach of your primaries.
- Experiment with the placement of each of these pins as you are doing it. You may need to stretch the wing in different positions to get the look you want.

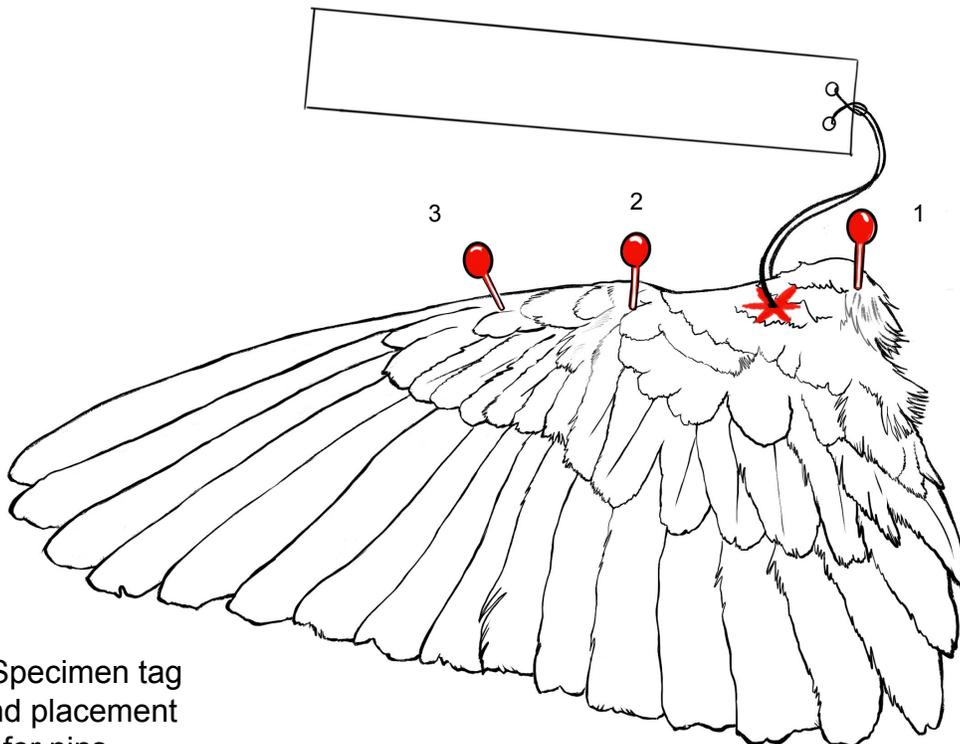


Figure 8: Specimen tag location and placement order for pins

Pinning the Wing...continued

Placing the Pins...continued

5. Now that you have the wing pinned, check if there are any places that are gaping or where the wing doesn't lay close to the pinning board. For large wings, these are often places around the elbow joint. Put a couple extra pins through this area to help secure the wing there while it dries.
 - During the drying process the skin will dry and contract. For large wings, this may result in pins being pulled out. Make sure you have your pins securely passed through the wing into the pin board.
6. Preen your wing! Are the coverts overlapping in the right order? Are there any primaries or secondaries that are trying to wander off? This is your chance to make sure things look the best you can make them.
7. To finish off pinning, take some thin strips of cotton to help keep the feathers in place. No matter the size of the wing, we always add a thin cover to the humerus joint area. This will help make sure the feathers from the scapulars and tertials do not develop cowlicks.
 - For large wings, or ones where feathers keep trying to lift up, use long thin pieces of cotton stretched across the wing to hold things down during the drying process. You can also use long strips of paper. Check with your lab to see what may be available.
 - When you are pinning cotton for a wing, remember you do not need to pin the cotton to the wing. Instead slip the cotton onto one of the pins already in the wing, or pin the cotton securely on either side of the outside of the wing.

And you are done! Now you just need to let the wing dry.

- A good rule of thumb: let the wing dry 1.5 times as long as you would dry a round skin for a bird of that size.
- When unpinning your wing, test if it's ready by trying to bend the carpal joint. If it still moves, pin the wing again and let it continue to dry.
- If you unpin the wing too early, the wing will contract at the carpal joint, and you will end up with a more closed wing than you had planned.