

# Avian Lighting Recommendations

## SUMMARY

In making your decision there are two primary factors, mentioned in class:

- **CRI:** 100 is perfect, anything above 91 is acceptable, but 95-98 is preferable.
- **Temperature (CCT):** 5000k to 5700k is what you want. This is critical. For bird species who are native to more temperate regions (Australia), you could go as high as 5900k if you find a particular bulb otherwise suits your purpose well.

## BULBS

We recommend base lighting that is relatively diffuse, and supplemental black lights to provide UV-A. The table below includes the full-spectrum lights we recommend with their specifications. The FeatherBrite bulb is the only bulb that includes UV and needs no additional black light.

While the ratio of base light to UV-A light (black light) should be in the proper proportion, the only calculation we've been able to make is for the tubes. For those, you would use one foot of T8 black light for every four feet (which is 2000 lumens) of T8 full-spectrum. So, a ratio of 1 to 4.

For the other black lights, especially those that are not tube shapes, we haven't been able to do an exact calculation. For now, you can use your judgment and use a small amount of black light to supplement the full-spectrum lights. We will be ordering stand-alone fixtures and equipment to do proper measurements, but this may take a while, so don't hold off on buying some black lights.

### **NOTE:**

For recessed sockets, you can use any of the bulbs listed in the table that fit, or you can use this 65-watt, 5000k bulb, though it is only a 90 CRI: <http://www.amazon.com/Equivalent-Daylight-Dimmable-Retrofit-Downlight/dp/B00U7IGERI>

Type	Notes	CRI	CCT (temperature)	Lumens	PROs	CONs
CREE LED light bar in 4 and 8 foot lengths	Use as core lighting. Be sure to order the correct CCT. Dimmable.	92	5000K	1000 lumens per foot. (8000 lumens for the 8-foot tube).	Very bright, great temperature. Long life (up to 10 years). Easy to install,	Very expensive. CRI at the low range of acceptable.

					no extra ballast required.	
Yuji VTC LED 14-watt bulb bulb	Use as core lighting. Dimmable.	95-98	5600K	NOT VERIFIED: Sources range from 440 lumens to 600-700 lumens.	Great overall specs; a very close second to the Philips T8.	Not as bright as the Philips or CREE tubes.
Philips T8 TL-950 tube	Use as core lighting. See NOTE above table. Not dimmable.	98	5000K or 5700K	500 lumens per foot (2000 lumens for a four-foot tube).	Best CRI of any bulb we're found with acceptable CCT. Individual bulbs are cheap.	Contains mercury. Needs proper electronic ballast (fixture). Only half the lumens of the CREE LED tube.
Maxum™ 5000k 54 Watt T5 (5000 47" F54T5HO)	Use as core lighting. See NOTE above table. Not dimmable.	93	5000K	1300 lumens per foot (5200 lumens for the 4-foot bulb).	Highest lumens per watt of any fluorescent lamp. Low mercury content compared to the T8 tubes.	Bulbs and fixtures can be expensive.
BlueMax™ 16w G30 Globe	Our lux measurements did not match the lumens claimed. Not dimmable.	93	5500K	900 lumens for this bulb. Other Blue Max bulbs vary greatly.	Fits in many incandescent fixtures. Perfect CCT.	<b>Read the instructions carefully;</b> it may require a fixture rated for a higher watt bulb.
FeatherBrite CFL 20-watt bulb	A good light that includes the proper ratio of UV. Our lux measurements did not match the lumens claimed. Not dimmable.	91	5500K	Supposedly 1050 lumens for the 20-watt bulb.	Excellent proportion of full-spectrum to UV-A.	Haven't verified the lumens. CRI is at the low range of acceptable.
SoLux Halogen 50-watt low	Optional supplementation,	98	5000K	50-watt 541 lumens.	Many fixtures available. Specs	Being a focused light, it is not an

voltage (12 volt) MR-16 bulb (2 pin socket)	good in specialized situations, for example, over a play stand. Should add a diffuser if using as base lighting. Dimmable.				(CRI and CCT) are excellent.	ideal base lighting option. Gets HOT.
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#### NOTE ON PHILIPS TUBES:

Be aware that some places will send you a Sylvania tube instead. Send it back, it is not the same specification as the Philips. The Philips tubes require electronic ballasts (fixtures). You can find off-the-shelf fixtures at hardware-type stores, or nicer-looking fixtures for the T8 tubes at <http://www.brodwax.com/strips.html>. However, these ballasts sometimes break after a short period of time.

## WHERE TO FIND FULL-SPECTRUM BULBS

**CREE LED Tube** (***IT SURE TO CHOOSE THE 5000k VERSION WITH EACH OF THESE, the default is usually not 5000k***)

8-foot:

<http://tinyurl.com/hp3l66f>

<http://www.shineretrofits.com/cree-ls8-80l-88w-8-8-ft-led-surface-ambient-luminaire-8000-lumens-dimmable-120v-277v.html>

4-foot:

<http://tinyurl.com/z2mew7u>

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<http://www.shineretrofits.com/cree-ls4-40l-44w-4-4-ft-led-surface-ambient-luminaire-4000-lumens-dimmable-120v-277v.html>

**LED Yuji VTC Bulb**

<http://store.yujiintl.com/collections/vtc-series/products/vtc-series-2nd-generation-high-cri-led-bulb-14w-unit-3-pcs>

**Philips T8 Fluorescent Tube**

Two-foot:

<http://tinyurl.com/z6augjq>

Four-foot in cases of 25:

<https://www.1000bulbs.com/product/152921/PHILIPS-209056.html>

Four-foot single but more expensive:

<http://www.amazon.com/Philips-209056-F32T8-Straight-Fluorescent/dp/B002DR5U9Y>

### ***Maxim T5***

[http://www.ultraluxlight.com/bluemax\\_f54t5ho\\_279\\_prd1.htm](http://www.ultraluxlight.com/bluemax_f54t5ho_279_prd1.htm)

### ***BlueMax CFL bulb***

[http://www.fullspectrum solutions.com/14w\\_globe\\_674\\_prd1.htm](http://www.fullspectrum solutions.com/14w_globe_674_prd1.htm)

### ***FeatherBrite CFL Bulb***

<http://www.featherbrite.com/fe20fuspbu.html>

### ***SoLux Halogen***

<https://www.solux.net/cgi-bin/tlistore/soluxbulbs.html>

## **BLACK LIGHTS**

UV peak output is around 400 nm and never below 360!!! UV-A content should be around  $5 \mu\text{W}/\text{cm}^2$  for every 100 lux. In general, try to match lighting types between visible and UV (tube-tube, LED-LED). Use approximately 4-to-1 full-spectrum to black light for tubes.

### ***LED Black Light***

You can find an appropriate LED black light here:

<http://www.americanmusical.com/Item--i-ADJ-BLB18W>

You can also contact Ian at this store in El Cerrito and tell them you want the Mickboo black light that John bought:

[https://www.batteriesplus.com/store-locator/ca/637?utm\\_source=local&utm\\_medium=googlemybusiness](https://www.batteriesplus.com/store-locator/ca/637?utm_source=local&utm_medium=googlemybusiness)

### ***T5 Tube Black Lights***

The only T5 black lights we've found are 12" bulbs. So since they are shorter than the full-spectrum T5 tubes, you would need to use a separate fixture for the black light bulbs if you're using T5s. You can purchase one here:

<http://1000bulbs.com/product/322/F-08T5BLB.html>

### ***T8 Tube Black Lights***

The F30T8/BLB black light peaks at 368nm which, of all the available black lights, is nearest to where avian vision peaks. It has a total UV output of 6.0 watts.

You can purchase the two-foot black light tube at one of the following places:

<http://www.blacklight.com/items/F17T8BLB>

You can purchase the three-foot black light tube at one of the following places:

[http://www.topbulb.com/find/Product\\_Description.asp\\_Q\\_intProductID\\_E\\_44237](http://www.topbulb.com/find/Product_Description.asp_Q_intProductID_E_44237)

<http://www.amazon.com/F30T8-BLB-Fluorescent-Black-Higuchi/dp/B003YNYU2O>

<http://www.blacklight.com/items/F30T8BLB>

You can purchase the four-foot black light tube here:

<http://www.blacklight.com/items/F32T8BLB>

We recommend against using this high-output version of the four-foot black light, which not only REQUIRES A DIFFERENT BALLAST than the ones suggested in this article, but would require a different ratio (much lower) of black light to visible light ratio.

<http://www.blacklight.com/items/WFF32T8BLB>