It makes the most sense to me to start from scratch with Euler's mass and momentum conservation equations:

$$\frac{\partial \rho}{\partial t} + \nabla \cdot (\rho \mathbf{v}) = 0 \tag{1}$$

$$\rho \frac{\partial \mathbf{v}}{\partial t} + \rho(\mathbf{v} \cdot \nabla)\mathbf{v} = -\nabla p + \rho \mathbf{g} + \mathbf{f_{rad}} \tag{2}$$

where ρ = wind density, $\mathbf{v}$ = wind velocity, p = gas pressure, $\mathbf{g} = -\frac{GM_{gal}}{r^2}$, and $\mathbf{f_{rad}}$ is the force per unit volume of wind material due to radiation. Murray (2005, ApJ, 618, 569) ignores gas pressure, so we set $p = 0$. With the galaxy having luminosity L and the gas having opacity κ, $\mathbf{f_{rad}} = \rho \frac{\kappa L}{4\pi c r^2}$.

If we assume a steady state for the flow, we can rewrite the above equations:

$$\nabla \cdot (\rho \mathbf{v}) = 0 \tag{3}$$

$$\rho(\mathbf{v} \cdot \nabla)\mathbf{v} = \rho \mathbf{g} + \mathbf{f_{rad}}; \tag{4}$$

Then, assuming spherical symmetry, we can rewrite them again in spherical coordinates:

$$\frac{d}{dr}(r^2 \rho v) = 0 \tag{5}$$

$$\rho v \frac{dv}{dr} = -\frac{\rho\, GM_{gal}}{r^2} + \rho \frac{\kappa L}{4\pi c r^2}. \tag{6}$$

Equation 5 of course implies $r^2 \rho v = const$, or in other words, $\frac{dM_{wind}}{dt} = const$. Dividing Equation 6 by ρ, and substituting $M_{gal} = 2\sigma^2 r/G$ (i.e., the galaxy is an isothermal sphere with velocity dispersion σ), we get

$$v \frac{dv}{dr} = \frac{\kappa L}{4\pi c r^2} - \frac{2\sigma^2}{r}. \tag{7}$$

Then it's easy to solve this equation, setting $v = 0$ at R_0:

$$v(r) = 2\sigma \sqrt{R_g\left(\frac{1}{R_0} - \frac{1}{r}\right) + \ln(R_0/r)} \tag{8}$$

with $R_g = \frac{\kappa L}{8\pi c \sigma^2}$. These are Murray's equations 26 and 27, for an optically thin wind. If you then choose whatever mass outflow rate you want ($\frac{dM_{wind}}{dt}$), we can write $r^2 \rho v = const = \frac{dM_{wind}}{dt}$, and solve for ρ:

$$\rho(r) = \frac{dM_{wind}/dt}{r^2\ v(r)}, \tag{9}$$

and you have some nice inputs for the radiative transfer code (I hope).

The requirement for the wind to be launched is that

$$\frac{\kappa L}{4\pi r^2 c} > \frac{2\sigma^2}{r}, \tag{10}$$

or

$$L > \frac{8\pi\sigma^2 R_0 c}{\kappa} = L_{Edd}. \tag{11}$$

Plugging in the definition for R_g (above), this implies $R_g = (L/L_{Edd})R_0$, and that R_g must be larger than R_0.

And now a comment. I had originally thought that Murray's "optically thick wind", discussed in section 2.3 of his paper, would be a good input, as his velocity equation for this is very simple:

$$v(r) = 2\sigma\sqrt{(\frac{L}{L_M} - 1)\ln(r/R_0)}. \tag{12}$$

However, this equation no longer makes sense to me. To obtain this equation, he first sets up the forces on an "optically thick" spherical shell (his Equation 14):

$$\frac{dP}{dt} = M_g(r)\frac{dv}{dt} = -\frac{GM(r)M_g(r)}{r^2} + \frac{L(t)}{c}, \tag{13}$$

where $M_g(r)$ is the mass profile of this shell. The force due to radiation here has no dependence on r, I guess because the shell completely surrounds the source and absorbs every photon no matter what r it has. He uses this equation to find the minimum luminosity required for the galaxy to blow out all its gas, L_M, and derives the acceleration equation:

$$\frac{dv}{dt} = \frac{GM(r)}{r^2}(\frac{L}{L_M} - 1). \tag{14}$$

If you just think of this as the equation of motion of a single shell, then I think you can replace $\frac{dv}{dt}$ with $\frac{dv}{dr}\frac{dr}{dt}$ and integrate to obtain $v(r)$ (Equation 10) for this shell. But, he uses this equation as the momentum equation for a "time-independent, optically thick wind (not a shell)"– now he's referring to an extended distribution of gas. And I think he's saying that each shell that makes up this distribution, at each radius, feels an acceleration given by Equation 12. This just doesn't seem right– how can all the luminosity from the galaxy get through the innermost shell to push on the next shell out? Maybe I'm missing something here. But my main point is, I like Equations 8 and 9 best for including in your models!